pp. 421–504] [June, 1943

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MAIN CONTENTS :

	PAGES		PAGES
Summary of Recent Abstracts V.—Leishmaniasis	421–427	Leprosy	462–465
Malaria	427–440	Helminthiasis...	466–480
Blackwater Fever	440	Deficiency Diseases	480–482
Leishmaniasis...	441–442	Sprue...	482–484
Fevers of the Typhus Group...	442–450	Haematology	484–485
Yellow Fever...	451–453	Venoms and Antivenenes ...	485–487
Cholera	454	Dermatology and Fungous Diseases	487–491
Amoebiasis and Intestinal Protozoal Infections	455–460	Tropical Ophthalmology ...	491–494
Relapsing Fever and other Spirochaetoses	460–462	Miscellaneous...	494–503
		Book Review	503–504

For detailed Contents see pp. ii, iv, v and vi.

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BUREAU OF HYGIENE AND TROPICAL DISEASES.

TROPICAL DISEASES BULLETIN.

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SUMMARY OF RECENT ABSTRACTS.*

V. LEISHMANIASIS.

VISCERAL.

Epidemiology : Aetiology.

According to GELDRICH (p. 673) the infantile form of kala azar occurs in the Mediterranean countries but is practically confined to coastal regions. He now reports the first case of this form in Hungary, and gives details of its successful treatment with neostibosan.

MCCLELLAND (p. 167) notes that kala azar is endemic in the Province of Hupeh, north-west of Hankow.

MARTÍNEZ NIOCHET and PONS (p. 607) report the first autochthonous case of kala azar in Venezuela.

SENEKJI and ZEBOUNI (p. 167) have studied the biochemical reactions of leishmania. All forms are aerobic ; there is no evidence of fermentation of sugars or of production of indole ; they are killed at once by heating to 45°C. It is claimed that *L. brasiliensis*, the parasite associated with American mucocutaneous leishmaniasis, is so resistant to bile that 30 per cent. of the leptomonads are alive after 7 days, whereas *L. infantum* and *L. caninum* are quickly dissolved.

Transmission : Animal Reservoirs.

SMITH, HALDER and AHMED (p. 447) note that blocked sandflies are found only in those batches which are allowed to feed on raisins after their infective blood meal ; flies given repeated blood meals without raisins did not become blocked. After blockage, most of the flies died within 48 hours. The same authors (p. 449) found that infected flies maintained on raisins induced infection when subsequently fed on five hamsters, but that infected flies maintained on repeated blood meals failed to do so. It seems, therefore, that the method of maintaining the flies is the important factor. [For an account of the earlier work by these authors on blocked sandflies and the transmission of kala azar, see this *Bulletin*, 1942, Vol. 39, p. 361.]

* The information from which this series of summaries has been compiled is given in the abstracts which have appeared in the *Tropical Diseases Bulletin*, 1942, Vol. 39. References to the abstracts are given under the names of the authors quoted, and the pages on which the abstracts are printed.

Although *P. chinensis* has been found in parts of N. China in which kala azar is unknown, and although kala azar may be seen where *P. chinensis* has not so far been found, YAO and WU (p. 449) consider that the association of this sandfly and the disease is, in general, so close that where the one is found the other will ultimately be discovered. They record the infection of hamsters by inoculation of flagellates from these flies. CHUNG and FENG (p. 169) in Peiping found flagellates in sandflies (*P. chinensis*) captured in a kennel in which was kept a dog suffering from leishmaniasis. Inoculation of flagellates from the flies into a hamster produced the disease.

PANDE (p. 537) describes a natural leishmanial skin infection of a bullock in Assam. Since oriental sore does not occur in Assam, whereas kala azar is common, the author favours the view that the parasite found was *L. donovani* and that the case was one of kala azar with skin lesions.

The view has been expressed that in dogs with kala azar it is the skin, rather than the internal organs, which is primarily affected, but HO, CHU and YUAN (p. 169) have noted that when parasites are found in the skin they are also present in the organs, and they have traced the course of infection in two dogs in which leishmania were found in bone marrow, the skin becoming infected at a later stage only. TORRES (p. 169) has studied the pathology of the skin in dogs affected with kala azar in S. America. Histiocytes, containing the parasites, accumulate and may form nodules, and ulceration of the skin may result from folliculitis. The skin lymphatics and the intercellular spaces contain cells infected with leishmania, and these cells are available to the intermediate host.

IRR (p. 168) discusses the formol-gel reaction in canine leishmaniasis. If the reaction is slow, the animals generally improve with treatment; if it is prompt they usually fail to respond. If the test does not become negative with treatment, relapses may be expected. STEIN and WERTHEIMER (p. 747) in Palestine have noted that a precipitate forms in the serum of dogs suffering from kala azar if it is kept at 5°C., and that the precipitate redissolves on reheating the serum to 37°C. The fraction concerned is known as the cold fraction, but there is another fraction which is precipitated on dilution, and a third which is precipitated by 11 per cent. sodium sulphate.

Clinical Findings: Treatment.

From a study of kala azar and malaria in a district in which both were prevalent, SMITH and AHMED (p. 448) do not support the view, which had previously been put forward, that kala azar suppresses malarial infection by virtue of the histiocytosis of the former disease. There is strong circumstantial evidence, but little direct evidence, that malaria may predispose to kala azar. With regard to prevention, the authors note that measures against the adult vectors of these diseases, all of which take shelter in houses, may be more effective than measures against the larval stages, which are found in totally different environments.

KIRK (p. 609) notes that, in the Sudan, visceral, cutaneous and oral leishmaniasis may exist side by side. There is difficulty in deciding whether ulcers are oriental sores or cutaneous complications of kala azar, but the author limits the diagnosis of oriental sore to those cases in which there is no fever or evidence of visceral or oral infection.

Purely cutaneous infections may be ulcers or nodules, and cutaneous manifestations of visceral disease may ulcerate in untreated cases, or may be non-ulcerating lesions following successful treatment of the visceral infection.

Cole *et al.* (p. 746) describe an outbreak of kala azar in a native battalion near Lake Rudolph in Kenya. Leishmania were found in only 22 of the 31 cases, and of the positive cases 14 proved fatal. The examinations performed included :—spleen smears 11 (7 positive), liver smears 6 (4 positive), bone marrow smears 8 (1 positive), gland smears 3 (2 positive). Blood culture failed in 10 trials. Treatment with intravenous tartar emetic (the only antimonial available) was not very successful, though it served to bring down the temperature. The evidence of cure in those discharged was not very convincing. Tobias (p. 608) failed to find leishmania by gland puncture in 20 cases of kala azar in native soldiers stationed in Abyssinia ; sternal puncture was positive in 1 of 12, and spleen puncture in 8 of 17. The cases were acute or subacute, and the author describes two of fatal agranulocytosis.

Adler (p. 607) points out that if Mediterranean kala azar cannot be diagnosed by ordinary methods, culture of the juice of any punctured organ should be attempted, and positive results are readily achieved in infected persons. This method should be adopted as a routine. [It would seem desirable to try this method in the Sudan, where, as shown above, diagnosis may be difficult.]

Chung and Lu (p. 168) have found a complement-fixation reaction, in which antigens prepared from the spleens or livers of moles and hamsters infected with *L. donovani* or *L. caninum* were used, to have a definite value in the diagnosis of kala azar. The results indicate that the two parasites are closely related, or identical, and suggest that in N. China the human and canine diseases are caused by the same parasite.

Jiménez Díaz and Castro Mendoza (p. 170) have found low values in kala azar for the lipoid and cholesterol content of the blood, and diminished esterification of the free cholesterol comparable with that which obtained in severe hepatic insufficiency. They suggest that the flocculation phenomena characteristic of the serum in kala azar are probably the result of the diminished amount of cholesterol esters.

Napier *et al.* (p. 171) report, for the first time, a case of post-kala azar dermal leishmaniasis in which the cornea was affected. Considerable improvement in vision, and resolution of skin and corneal lesions, took place after treatment with potassium iodide and organic antimonials. It is noted that one-quarter of the patients with post-kala azar dermal leishmaniasis in Bengal give no history of treatment for kala azar.

Soong and Anderson (p. 171) discuss the evaluation of drugs in experimental leishmaniasis. They obtained good results in a series of infected hamsters by injecting one-tenth of the L_{50} dose subcutaneously three times each week until a total quantity equal to the L_{100} dose had been given. For neostibosan this total was 4 gm. and for ureastibamine 3 gm. per kilo. body weight, but it is pointed out that the evaluation of ureastibamine is unsatisfactory because its antimony content varies between 20 and 43 per cent. There is no rapid method for determining the value of any drug, and careful pharmacological investigation is necessary.

Kikuth and Schmidt (p. 450) have carried out therapeutic trials in animals which indicate that in kala azar equal doses and courses

of solustibosan and neostibosan produce equal results, though solustibosan contains considerably less antimony than does neostibosan. Solustibosan is better tolerated by the animals, and in intensive treatment gives at least as good results as neostibosan.

SATI (p. 747) has experienced a 20·7 per cent. mortality in a large series of cases treated with antimony compounds in the Sudan. This is a higher death rate than is seen in India, but it cannot be said that antimony treatment is a failure. A combination of drugs gives better results than the use of one alone ; he has used tartar emetic, neostibosan, solustibosan and neostam. The treatment should be started as early in the disease as possible, and large doses should be given from the beginning. The author notes that gland puncture has greatly facilitated the discovery of the parasites.

BRAHMACHARI (p. 537) describes a new antimonial, neostebene, which promises well for the intramuscular treatment of kala azar. It contains 41 per cent. of antimony.

ADLER and TCHERNOMORETZ (p. 748) report on the action of various aromatic diamidines in experimental kala azar (*L. donovani* and *L. infantum*). Propamidine (4 : 4′ diamidino diphenoxy propane) is as effective as stilbamidine (4 : 4′ diamidino stilbene) in light infections, but not so good in heavy infections. The same authors (p. 173) found that 4 : 4′ diamidino stilbene in doses of 1 to 40 mgm. per kilo. body weight has a definite therapeutic action on hamsters infected with *L. infantum* and *L. donovani*, but that infections due to *L. infantum* were more resistant than those due to *L. donovani*. This is in line with the fact that, in man, Mediterranean kala azar requires at least three times as much ureastibamine or neostibosan as the Indian disease, to effect cure.

WINGFIELD (p. 172) treated an Indian patient, suffering from kala azar, with 4 : 4′ diamidino stilbene in doses of 45 mgm. given daily by the intravenous route for 10 days. This course of treatment was repeated, and after the end of the second course the patient was apparently cured. Faintness, breathlessness and headache were noted after the injections, but these could be avoided by giving the injections slowly. Blood pressure fell after the injections, and with it fell the level of blood sugar ; it is suggested that the drug may exert an effect antagonistic to that of adrenalin [see NAPIER and GUPTA below].

ADAMS (p. 172) reports a case of kala azar in an Indian in which great improvement followed 8 daily intravenous injections of 4 : 4′ diamidino diphenoxy pentane in individual doses of 2 mgm. per kilo. body weight. The fall in blood pressure immediately after each injection was considerable, but return to normal took place in 10 minutes. A similar fall was observed after intramuscular injection. HUMPHREYS (p. 749) reports good effects in two cases of oropharyngeal leishmaniasis in the Sudan by treatment with pentamidine (4 : 4′ diamidino diphenoxy pentane). The dosage was 7,700 and 8,500 mgm. in 66 and 72 injections respectively, spread over a period of 3 months.

NAPIER and GUPTA (p. 748) refer to the marked fall in blood pressure, associated with various unpleasant symptoms, which takes place during the intravenous injection of 4 : 4′ diamidino diphenyl ethylene, and which usually passes off quickly. If the blood pressure fails to return quickly to normal, an injection of adrenalin restores it almost immediately. In four cases anaesthesia to light touch over the trigeminal area developed some months after treatment, but showed a tendency towards spontaneous cure.

Cutaneous (Oriental Sore).

Shah (p. 173) gives an account of an outbreak of oriental sore in Delhi, where *Phlebotomus sergenti* is prevalent. Examination of the sandflies revealed a proportion infected with flagellates which were regarded as developmental forms of *Leishmania tropica*. Widespread infection was found in the population of a rocky ridge in the area, and it was estimated that almost 20,000 cases occurred in 1939–40. Diagnostic methods included the finding of leishmania and a skin test involving the intradermal injection of "leishmin," presumably an antigen prepared from cultures of the parasite. To this test 75 of 76 affected boys were positive. The sores were characteristic. The treatment of choice consisted of scraping and dressing with tannic acid powder or magnesium sulphate paste. Tartar emetic ointment (4 per cent.) was useful, but injection of trivalent or pentavalent antimony compounds is the only specific. No single treatment can be expected to cure all cases.

In the Report for 1938–39 of the All-Union Institute of Experimental Medicine, U.S.S.R. (p. 538), it is recorded that experiments have indicated that the gerbil *Rhombomys opimus* is the principal source of human cutaneous leishmaniasis. Up to 60 per cent. of these rodents are naturally infected in Turkmenistan, and the identity of the gerbil and human parasites was established by cross infections. Spontaneous infections were also found in two other species of gerbils and a marmot. Sandflies captured in rodent burrows proved to be infected with leptomonad forms, to the extent of 35 per cent. Additional proof of the view that human disease originates from rodents is afforded by the fact that destruction of rodents in their burrows was followed by a decreased incidence of human infection from 70 to 0·4 per cent.

Adler and Ber (pp. 174, 451) have succeeded in inducing in man oriental sore from the bites of *P. papatasi* infected with *L. tropica* by feeding through a membrane on a suspension of washed flagellates. The flagellates were in a medium consisting of three parts of 2·7 per cent. saline and one part of inactivated defibrinated rabbit blood. The flies, after feeding, were maintained at 30°C. and were allowed subsequently to feed from time to time on a person who had recovered from oriental sore. They were then allowed to bite five volunteers, each of whom became infected. [It is interesting to compare these procedures and results with those of Smith *et al.* (above) in kala azar.] The authors suggest that the ease with which transmission was effected in this work may perhaps be related to the temperature of maintenance and to the high salt content of the flagellate medium. They refer to an outbreak of oriental sore in a Dead Sea area where the soil had a high saline content, and to the fact that the disease is rarely seen a short distance away, where the salinity is lower.

Katzenellenbogen (p. 750) refers to the prevalence of oriental sore in persons settled near the Dead Sea in Palestine. He attempted vaccination with flagellates from culture or with leishmania from the spleens of infected hamsters. Sores developed at the point of inoculation except in persons with a history of past infection or who had long resided in the area. In one year over 100 cases of oriental sore occurred in unvaccinated persons, but none in the vaccinated.

Senekji (p. 174) shows that from *L. tropica* can be obtained a flagellar and a somatic antigen; further, an S (polysaccharide) and an H fraction can be separated. Non-immune persons do not react to

injection of these fractions or of whole leptomonads, but persons suffering from oriental sore give allergic reactions to each, which reach maximum in 24 hours. In persons recovered from oriental sore reaction to the S fraction is not constant, but that to whole leptomonads is definite.

DOSTROVSKY and SAGHER (p. 749) report favourably on the effect of infra-roentgen rays (grenz rays) on oriental sores and nodular lesions. Details of dosage are given.

HRAD (p. 609) reports a case of nodular skin leishmaniasis which had apparently persisted for 11 years. Cure was effected by means of electro-coagulation.

MUCO-CUTANEOUS (AMERICAN).

PESSÔA (p. 175) considers that in the State of São Paulo, Brazil, man is the reservoir of cutaneous leishmaniasis; no evidence is available to incriminate the dog. In prevention it is not posible to adopt measures against sandflies, since knowledge of the actual vectors and their habits is lacking. A method of vaccination with cultures of *L. brasiliensis* has been tried, and there is some evidence that an appreciable degree of protection may be conferred. Treatment is useful in controlling spread of infection; the drugs advocated include tartar emetic, fouadin and anthiomaline, while atebrin may be injected round the lesions.

The same author (p. 673) notes that in the areas of high endemicity of São Paulo, Brazil, cutaneous leishmaniasis occurs chiefly in persons who give a history of 6–12 months' residence. Infants are especially liable. Although new cases may be found throughout the year, the maximum incidence is in autumn, and the prevalence of the disease bears a definite relationship to the density of the sandfly population, and also to their predilection to attack man, and to atmospheric temperature and humidity. Cure is spontaneous in 7 per cent. of cases. In patients who have had cutaneous lesions for a year or more, some involvement of the nasal mucosa is found in 80 per cent.

REY-MATIZ (p. 174) reports that cutaneous leishmaniasis is widespread in Colombia and that material from human sores produced lesions when injected into the dog and the agouti.

PESSÔA and COUTINHO (p. 175) found leptomonad infection in 0·23 per cent. of species of Phlebotomus in a part of Brazil in which the incidence of cutaneous leishmaniasis is high; other biting insects were not infected. PESSÔA and PESTANA (p. 610) report leptomonads, which were identified as *L. brasiliensis*, in *Phlebotomus migonei* in Brazil. COUTINHO (p. 610) found leptomonads in dissected *P. pessoai* in the same area.

PESSÔA and PESTANA (p. 609) describe, as the primary lesions of American cutaneous leishmaniasis, papular elevations of the skin, impetiginous foci, or fissures on the lips.

VILLELA *et al.* (p. 610) have found leishmania in the apparently normal mucous membrane of the nose, in patients with cutaneous leishmaniasis. They conclude, therefore, that in this form of the disease, treatment should include the use not only of antimonials but also of eparseno, which is, they claim, the only drug which acts on leishmania infection of mucous membranes. Eparseno is an arsphenamine solution ready for injection. [See this *Bulletin*, 1933, Vol. 30, p. 325; 1940, Vol. 37, p. 353.]

The Montenegro skin test is performed by injecting intradermally an antigen consisting of a phenolized suspension of cultural forms of *L. brasiliensis*; in positive cases there develops, during the course of 48 hours, a specific papule which persists 4 or 5 days. PESSÔA and PESTANA (p. 673) report that it is a group reaction, since positive results are given with antigens from other species of Leishmania and with *Trypanosoma cruzi*. In some cases of leishmaniasis the result may be negative, and positive reactions may be seen in other infections; the test, therefore, should always be controlled by careful clinical observation. It is, however, held to be the best method for detecting infection in the course of a survey. ARANTES (p. 170), however, claims that the test is so specific that it is a useful aid in the diagnosis of leishmaniasis, but he admits that in some cases of glandular tuberculosis a positive result has been obtained. He tested the reaction in 140 lepers and found no positive results unless there had been previous leishmaniasis; the leprotic state did not modify the reaction, which was positive in some cases in which recovery from the leishmania infection had taken place twenty years before.

PESSÔA and PESTANA (p. 674) have used a vaccine, prepared from cultures of the leishmania of cutaneous leishmaniasis in Brazil, for the inoculation of a group of people. In the 4 months following vaccination the incidence of the disease in the vaccinated group was 1 per cent., in a control group 8 per cent. The authors regard this result as encouraging and propose to continue the method, perhaps with an improved vaccine.

DO AMARAL (p. 175) has subjected cultures of *L. brasiliensis* to low temperatures and notes some loss of vitality, which is restored on return to 23°C. Cultures grow best at 20° to 28°C.

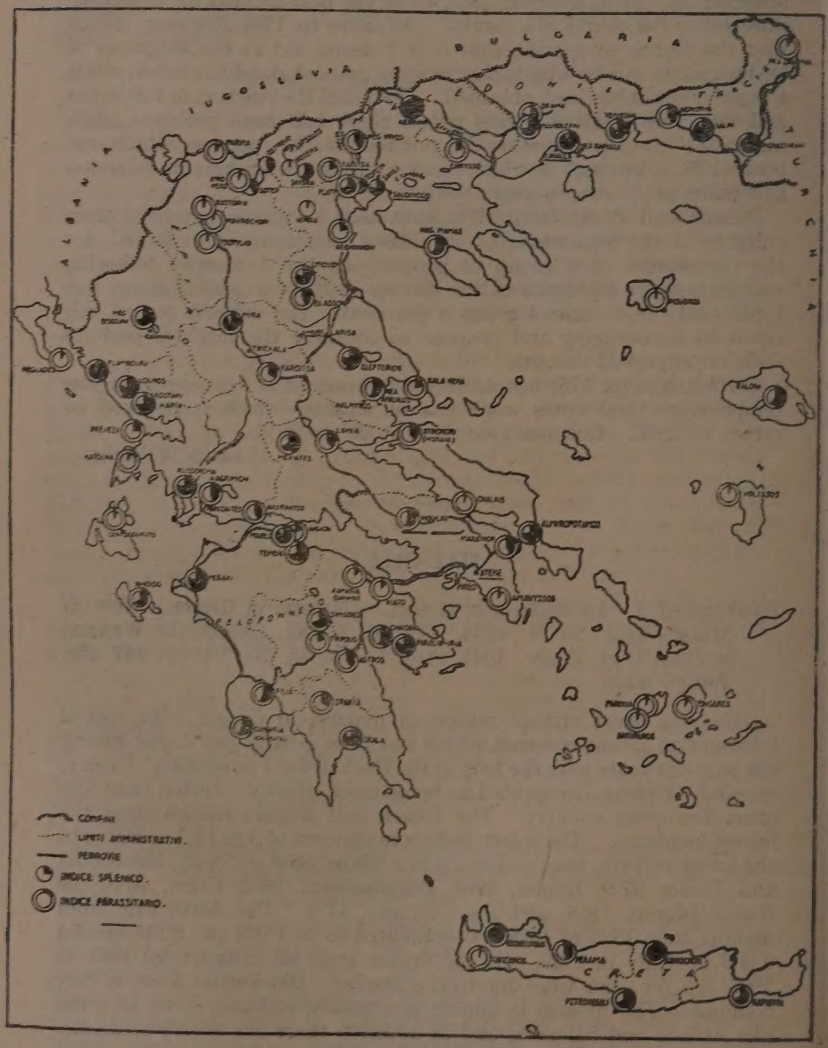
Charles Wilcocks.

MALARIA.

PAMPANA (E.). La malaria in Grecia. [**Malaria in Greece.**]—*Riv. di Malariologia.* Sez. I. 1941. Vol. 20. p. 187. [Abstr. (by WEYER) in *Deut. Trop. Ztschr.* 1941. Aug. 1. Vol. 45. No. 15. pp. 457–459. With 1 map.]

This is a short critical review of malaria in Greece with special reference to recent research which has been greatly developed during the past ten years with the help of the Rockefeller Foundation. Greece, especially Epirus, is regarded as being more heavily infected than any other European country. The Ionian and Aegean islands show the lowest incidence. The spleen indices in children of 5 to 15, according to the latest surveys, were :—Greece as a whole, 35·6 per cent., Macedonia and Thrace 37·9, Epirus, 49·9, Peloponnesus, 39·2, Crete, 40·3, the Ionian islands, 18·5, and the Cyclades, 17·1. The death rate from malaria from 1925 to 1929 was estimated to be 1·024 per mille against 0·067 for Italy in 1929. Of the deaths from all causes from 1921 to 1925, 5·6 per cent. were due to the disease. Blackwater fever is very common. The disease is almost universally endemic, even in cities like Athens and Salonica, and in addition there are severe epidemics from time to time; these depend on weather conditions. Heavy rain causes flooding and the formation of pools in the estuaries of rivers

such as the Vardar, Struma, Lamgada and Pinios. Heavy rainfall in the early part of the year is followed by summer epidemics. Dry weather in February and through the summer justifies a forecast of low incidence. The latest severe epidemics were in 1931 and 1935: In these years half of the cases in summer were due to *P. falciparum* infections; and more than half in autumn. The rest were due to *P. vivax*; *P. malariae* was almost entirely absent. In years of endemicity (1933 and 1934) the infections were *P. falciparum*, 38 per cent.; *P. vivax*, 24 per cent.; and *P. malariae*, 31 per cent.



Spleen and parasite indexes of school-children in Greece and Crete, based on a survey in 1933–34.

In the past ten years some severe epidemics were associated with movements of population due to war and other causes. The first cases of fresh infection appear in late May or early June, so that quinine prophylaxis must be started early in May. Malaria in general reaches its height in early August and remains at a high level till October. *P. vivax* infections reach their peak in August; those due to *P. falciparum* in October. Infected Anopheles are first found towards the end of May: of the eight species found in Greece the only ones of practical importance are *A. maculipennis* (var. *typicus* and *messeae*), *A. sacharovi* (*elutus*) and *A. superpictus*. Breeding of *A. sacharovi* begins as early as April and is at its height in June and July, when *A. maculipennis* also is most numerous. *A. superpictus* first comes into evidence in June: infected females are first found in July, and are most numerous in August and September. In Macedonia in September the sporozoite index was 3·8 per cent. for *A. sacharovi*; in August it was 3·1 per cent. for *A. superpictus*: and in July, 0·5 per cent. for *A. maculipennis*. The breeding places of the important vectors are fairly well known. *A. superpictus* breeds in open and rather shallow water: in the margins of hill streams: in streams with sandy bottoms: and in hill rivulets. *A. sacharovi* and *A. superpictus* have an extreme range of flight of at least 5 kilometres. Individually, *A. superpictus* is a more effective vector than the others, but *A. sacharovi* assumes importance because of its predilection for human blood: of specimens caught in living rooms in Macedonia, 61·0 per cent. had fed on human beings: of those caught in cattle stalls, 7·5 per cent. For *A. superpictus* the corresponding figures were 29·7 and 1·6 per cent.: and for *A. maculipennis*, 21·1 and 0·5 per cent. It is still a matter of doubt whether *A. superpictus* or *A. sacharovi* is the more important vector; the latter is regarded as the chief vector in Macedonia, but in other localities which have been less thoroughly surveyed the former may sometimes be the usual vector.

The last section of the paper deals with the energetic measures of control that have been carried out in certain areas: the history of malaria in Greece: and the influence on the disease of war with movements of troops and civilians. Care must be taken to employ proper preventive measures so as to avoid the ravages caused by the disease in the last war.

The map shows the spleen and parasite indexes, based on a survey of school-children in 1933–34 in 97 localities, including a number of large towns. *John W. D. Megaw.*

PAMPANA (E.). La malaria nella ex-Jugoslavia. "**Malaria in Yugoslavia.**"—*Riv. di Malariologia*. Sez. I. 1941. Vol. 20. p. 205. [Abstr. (by WEYER) in *Deut. Trop. Zschr.* 1941. Aug. 1. Vol. 45. No. 15. pp. 459–460.]

The whole of Yugoslavia is malarious with the exception of some places at high altitudes and a few islands off the Dalmatian coast. The highest incidence is in South Serbia and the Danubian plain, including Belgrade and Dalmatia. In Croatia the valleys of the rivers Mur and Drave are the most malarious regions. In a population of 14 million in 1929 the notified cases were about 600,000, but the real number must have been considerably higher. The vectors concerned were the same as in Greece. *Anopheles superpictus* was especially abundant in central and southern Dalmatia and the coastal region of Montenegro.

All varieties of *A. maculipennis* were found ; *labranchiae* in northern and central Dalmatia ; *atroparvus* was seldom found ; *subalpinus* was occasionally observed ; *typicus* and *messeae* were frequent. The last two were found to be locally associated with transmission, first in uplands then in the valleys and plains. *A. maculipennis* and *A. sacharovi* are the chief vectors of spring and summer infections by *P. vivax* : *A. superpictus* probably plays the chief part in the autumn transmission of *P. falciparum.* In southern Serbia the first observed breeding was in the second half of April ; further south it was a fortnight earlier. *A. maculipennis* reached its greatest numbers in the second half of July. Eggs of *A. superpictus* begin to be laid early in April, but the first brood is destroyed by the heavy April rains ; it becomes most abundant in August when the streams carry little water ; the lower the rainfall from June to September the better are conditions for breeding. The multiplication of *A. maculipennis* is promoted by heavy falls of snow in winter and of rain in spring. ; the period of transmission is from the end of May till November. The curve of *P. vivax* infection has an early peak in April and May, and a second higher rise in August and September. The curve of *P. falciparum* shows only one peak, in September and October. In Dalmatia at one time 150,000 cases were estimated to have occurred in a population of about 600,000, but conditions have probably improved considerably since that time. The chief breeding grounds here are in rain-water cisterns. The islands Veglia, Pogo and Arbe, off the Dalmatian coast, were formerly infected. In South Serbia there is malaria in the plains as well as in the hills. In the years 1928–32 in one locality 66 per cent. of the cases were due to *P. vivax* ; 31 per cent. to *P. falciparum* and 3 per cent. to *P. malariae. P. falciparum* infection occurs chiefly in persons over twenty years old. The highest parasite and spleen rates are in children of one to five years. Prevention consists chiefly in the establishment of stations for research and control ; the conversion of cisterns to mosquito-proof reservoirs ; and efforts at larval control in the valleys. Excellent results followed the introduction of *Gambusia* in the Dalmatian coastal areas and islands. *John W. D. Megaw.*

COLLIGNON (E.). La campagne antipaludique de 1941 dans le département d'Alger. [**Antimalaria Campaign of 1941 in the Department of Algiers.**]—*Arch. Inst. Pasteur d'Algérie.* 1942. June. Vol. 20. No. 2. pp. 147–161. With 4 figs. on 2 plates & 2 graphs.

Deficient rainfall characterized 1941 in the Department of Algiers as it did the previous year. The late autumn rains of 1940 were rapidly absorbed by the dry earth and in the ensuing winter the precipitation was below the average. As a result there was almost a complete absence of the usually numerous small spring-time mosquito breeding places and even many of the small marshes and small water courses that usually hold water throughout the spring were dried up at the end of winter. As a result malaria prevalence was low. *P. vivax* infections were most in evidence : *P. falciparum* infections were much less numerous than usual. *A. bifurcatus* and *A. algeriensis* larvae were first found on 15th March, *A. maculipennis* larvae a week later. *A. hispaniola* larvae were not found till the 12th June. *A. maculipennis* is the most prevalent anopheline. Adult Anopheles were most numerous from April to July. An abnormally warm autumn extended the usual season of prevalence ; they were fairly numerous in the first

half of November. Prophylactic medication was used in some areas, and Gambusia, as in past years, was found to be of great value in a variety of permanent mosquito breeding places. Gambusia flourishes in Algeria.

The spleen indices show little change as compared with previous years. These at the beginning and the close of the malaria season were : coastal districts 26 and 26 ; interior districts 33 and 19 ; for the whole department 28 and 25 per cent. *Norman White.*

ORTEGA (Francisco). Campaña antipalúdica de 1942. [**Antimalaria Campaign in 1942.**]—*Rev. Méd.-Quirúrg. de Oriente.* Santiago de Cuba. 1942. Sept. Vol. 3. No. 3. pp. 162–172. With 1 fig.

There was a sharp outbreak of malaria in Santiago de Cuba during the last two months of 1940 and the first 3 months of 1941 ; known cases totalled 664 and there were 31 deaths ascribed to malaria. There was a very low incidence of the disease in April and May 1941, and all special measures, except for a certain amount of permanent drainage work, were suspended. During the last six months of 1941, however, the malaria mortality of the city was unduly high, averaging 10 deaths a month. The present report is mainly concerned with the epidemic outbreak that followed in the spring of 1942, and the measures that were taken to combat it. During February, March and April 1942, 478 cases were reported, 16 of which terminated fatally. Of the 220 positive blood films that were examined, *P. falciparum* was found in 217, *P. vivax* in 3. Some information is given of the anopheline breeding places, but nothing is said of the species of Anopheles responsible for the outbreak. Cases were treated almost exclusively with quinine ; oiling was the antilarval measure employed. Much of the report, including recommendations for the future based on the experience gained, is of local interest only. *Norman White.*

FEREAUD (Cástulo). Contribución al estudio de las formas clínicas del paludismo. [**Contribution to the Study of Clinical Manifestations of Malaria.**]—*Rev. Méd.-Quirúrg. de Oriente.* Santiago de Cuba. 1942. June. Vol. 3. No. 2. pp. 73–77.

To illustrate the protean clinical manifestations of malaria the author gives notes of ten of the most interesting cases of malaria he has had in his ward of the Saturnino Lora General Hospital during recent years. The forms of the disease illustrated are epileptiform, dysenteric, cerebral, blackwater, and rheumatic. There was a case in which miscarriage was caused by malaria ; a case in which the symptoms simulated appendicitis, and a case in which the intense anaemia was due to the association of malaria parasites with Necator infection. It seems remarkable that so many relatively rare manifestations of malaria should be reported from the Oriente Province of Cuba, where malaria endemicity is low [this *Bulletin*, 1940, Vol. 37, p. 664]. *Norman White.*

DJAPARIDZE (P. S.). **Immunity in Malaria, based on Materials from the Endemic Regions of Abkhazia ASSR.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1942. Vol. 11. No. 3. pp. 3–11. [In Russian.]

The data on immunity in malaria described in this paper are based on mass observations conducted in the course of two years (1927–8) in the Abkhazian Republic [Black Sea coast of Caucasus], where the three main species of parasites occur. The task was facilitated by

the fact that in one of the districts (Gal) no antimalarial measures whatever had been undertaken, the disease was hyperendemic and its course could be observed in its pure form. The conditions in the Gal district are compared with those in Gudaut district, which was characterized by epidemic outbreaks with a low general incidence of malaria.

It was found that the population of the hyperendemic region, having been repeatedly exposed to seasonal infections in the course of 4–5 months from year to year, had developed a relative immunity [premunition] which is strictly strain-specific. The parasite rate reaches its maximum at the age of 5, after which it gradually decreases until by the age of 40 it is halved, the spleen rate is highest between the ages of 6 and 10, diminishing slightly after the age of 20. When both benign and malignant tertian malaria are present, the population acquires a more stable immunity against the former. On account of this, in hyperendemic localities the incidence of *P. vivax* in the blood decreases with the age of the patients, and conversely, the predominance of *P. falciparum* rises with their age.

The immune state of the adult population in the hyperendemic region was reflected (1) in the absence of severe clinical forms of malaria (including comatose cases), and (2) in the presence of infected persons showing no symptoms at all. Immunity observed in Abkhazia appears to be of the same type as that recorded for natives of tropical countries (premunition), though the resistance to infection is less pronounced in the Caucasians. *C. A. Hoare.*

Wilcox (Aimee). **Manual for the Microscopical Diagnosis of Malaria in Man.**—*Nat. Inst. Health. Bull. No. 180.* Wash. pp. ix+39. With 13 plates (6 coloured). [38 refs.]

In this manual of 39 pages of text, illustrated with 13 plates of coloured drawings from thin and thick blood films and microphotographs, the diagnosis of malaria by microscopic examination of the blood is fully discussed. Special importance is attached to the thick film, but it is emphasized that a knowledge of the appearance of malarial parasites in thin films is a first essential if the identification of parasites in thick films is to be successfully accomplished. A clear account is given of the method of preparation of thin and thick films and of their staining—by Wright or Leishman stain for thin films and by dilute Giemsa stain or a mixture of dilute Giemsa and Wright stain for thick films. The morphology of the three common malarial parasites is carefully described and illustrated in three excellent coloured plates. This is followed by an account of the appearances of these parasites in thick films. The manual cannot fail to be of use to those laboratory workers whose duty it is to examine blood for evidence of malarial infections and, as stated in the "Foreword" by M. A. Barber (who has had an unrivalled experience in the examination of blood films for malarial parasites) the publication is "a clear, thorough, and timely treatment of an important subject." *C. M. Wenyon.*

Sierra Leone, Medical Department. **A Blood Staining Technique for Malaria.** [Technique adopted in June, 1940 by Drs. A. J. Walker & T. H. Davey, at the Sir Alfred Jones Research Laboratory, Freetown.] 3 pp.

The main interest of this pamphlet is that it describes a modification of the now well-known method of Field for staining thick blood films

for malarial parasites [this *Bulletin*, 1940, Vol. 37, pp. 808, 874]. The thick film is first immersed for one second in the methylene blue solution diluted one in four with distilled water, washed in tap water and then stained for ten minutes in diluted Giemsa stain, rinsed in tap water and allowed to drain and dry. There are useful hints in the pamphlet but some confusion detracts from its value. If properly revised it might serve a useful purpose. *C. M. Wenyon.*

Chabelard (R.). La diagnose différentielle entre *Anopheles hispaniola* et *Anopheles sergenti*. [**Differentiation between** *A. hispaniola* **and** *A. sergenti*.]—*Arch. Inst. Pasteur d'Algérie*. 1942. June. Vol. 20. No. 2. pp. 139–146. With 4 figs.

Sergent (Etienne). De quelques caractères différentiels des larves d'*Anopheles maculipennis* var. *atroparvus* du Limousin et var. *labranchiae* du littoral algérois. [**Differentiation of larvae of** *A. m. atroparvus* **and** *labranchiae* **in Algeria.**]—*Arch. Inst. Pasteur d'Algérie*. 1940. June. Vol. 18. No. 2. pp. 216–220. With 2 figs.

Goritzkaya (V. V.). Valeur épidémiologique de femelles printanières de l'*Anopheles maculipennis* Meig. dans les conditions de la région de Dniépropétrovsk. [**Epidemiological Importance of Overwintering** *A. maculipennis* **in the Region of Dniepropetrovsk.**] —*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 500–502. With 2 graphs. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. p. 24.]

Observations during eight years in the Province of Dniepropetrovsk showed that some of the overwintered females of *Anopheles maculipennis*, Mg., abandon their hibernation quarters in the first half of March and some in late March or early April, their appearance almost coinciding with the beginning of the spring outbreak of malaria, which is due to relapses and occurs in April–May. The mean April temperature (8·5°C. [47·3°F.]) is, however, too low for the completion of development of the malaria parasite in the mosquitos ; even if some enter warm buildings and become infected, they soon fly out to oviposit in the open. It appears, therefore, that mosquitos that become infected after they have left their hibernation quarters cannot transmit malaria until May, when the temperature becomes favourable. To ascertain whether overwintered females can survive until then, individuals taken between 21st March and 30th May, including some of the first generation, which emerged between 17th and 19th May, were dissected and their oviducts were measured. The measurements showed that a small proportion of the mosquitos taken late in May had oviposited and so must have belonged to the overwintered generation, since the first-generation females could not have matured their eggs before 30th May. It appears, therefore, that some of the overwintered mosquitos live until the end of May, and possibly the beginning of June, though most of them die earlier. The first infected mosquitos found were individuals with immature oöcysts on the stomach on 29th May, and sporozoites occurred in the salivary glands in June. Further south in the Province, mosquitos with mature oöcysts were taken at the end of May. It appears, therefore, that the mosquitos responsible for the first fresh cases of malaria may belong to the overwintered or first generation, but the latter is the more important.

Popov (V. M.). Sur la biologie de l'*Anopheles maculipennis messeae* hivernant dans les locaux habités. [**Biology of Hibernating** *A. m. messeae.*]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 503–504. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. pp. 24–25.]

Females of *Anopheles maculipennis* var. *messeae*, Flni., have been observed in various parts of the Russian Union to emerge from hibernation in warm rooms and suck blood some time before they appear in the open. In investigations in western Siberia in 1939, large numbers of mosquitos were taken on 27th March in an inhabited house and in the basement of a hospital in a village north-east of Tomsk, and since this is the only variety of *A. maculipennis*, Mg., that occurs in this region, with the exception of a very small proportion of var. *typicus*, it is assumed that they belonged to var. *messeae*. The patients stated that the mosquitos frequently attacked them, and a few very active ones were present in the wards. Of the 76 individuals taken in the living-room and kitchen of the house, 17 (22·4 per cent.) contained blood, and most of these had evidently fed on the day of capture or on the preceding day. A calf was kept in the kitchen, and precipitin tests with blood from eight of the mosquitos showed that five had fed on cattle and one on man; the results for the other two were negative. In all, 28 mosquitos were dissected; mature eggs occurred in two of them, but were abnormal in one of these. Of the 15 individuals that had not yet taken blood, only two contained any considerable amount of fat, and the others had evidently terminated hibernation. Of the seven females taken in the hospital, five contained mature eggs. Mosquitos were not observed in daytime shelters in Tomsk until 25th April. It is concluded therefore that mosquitos in inhabited buildings began to suck blood some two months before they left them, though the females with mature eggs were found as early as 27th March.

Krasikova (V. I.). Sur le remplissement du jabot chez les *Anopheles maculipennis messeae* gorgés de sang. [**Distension of the Crop of Engorged** *A. m. messeae.*]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 505–507. With 1 fig. & 1 graph. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. p. 25.]

Females of *Anopheles maculipennis* var. *messeae*, Flni., taken in the Province of Kuibyshev during 1935–37 were frequently observed to have the crop distended with fluid so that it occupied part of the abdomen. Investigations were carried out on individuals taken in hibernation quarters in winter and in daytime shelters in summer. The former were allowed to feed in the laboratory and had access to water. Various degrees of crop distension were observed in these after feeding, and in the summer mosquitos, and the author describes and figures 11 stages in which the portion of the abdomen filled by the crop ranged from one-half of a segment to three complete segments. The percentage showing crop distension increased from May to September in the summer mosquitos, with a slight decrease in July, and decreased during the winter in the hibernating individuals. These findings were confirmed by observations in Kazan in the summer of 1938.

Blakhov (A. A.) & Kuptzova (A. D.). Le transport des moustiques malarigènes par les navires. [**Transport of Malaria Vectors in Boats.**]—*Med. Parasit & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 508–510. With 1 graph. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. p. 25.]

Periodical inspection between May and September 1938 of river steamboats arriving at Astrakhan showed that malaria mosquitos [*Anopheles maculipennis*, Mg.] occurred on a high proportion of them. The most infested were local boats that plied in the delta of the Volga. The mosquitos were most abundant in June and July and occurred chiefly in quarters in which the passengers were most crowded. No considerable numbers of mosquitos were found in buildings close to the landing-places in the villages and towns at which the boats called. Of 875 mosquitos taken on these boats between 14th July and 25th September, during which period the incidence of malaria in the region usually increases, none was found infected with malaria parasites.

Russell (Paul F.) & Rao (T. Ramachandra). **On Relation of Mechanical Obstruction and Shade to Ovipositing of** *Anopheles culicifacies*.—Reprinted from *Jl. Experim. Zool.* 1942. Nov. 5. Vol. 91. No. 2. pp. 303–329. With 6 figs. [10 refs.]

The authors, working in a rice growing area in the Madras Presidency, observed that *Anopheles culicifacies* breeds in numbers in the paddy field, till the plants reach a height of about 12 in. After that the larvae of this species cease to be found. In the present paper they describe experiments in which they attempt to analyse their field observations by introducing artificial mechanical obstructions and shade.

They base their conclusions on collecting eggs and identifying the species from them. It has been shown that when the rice plant reaches a height of a foot or more not only the larvae but also the eggs of *A. culicifacies* are absent, but if eggs are introduced from elsewhere they hatch and the larvae feed successfully. It follows that the absence of early stages from this particular habitat is not due to such a factor as predators, but to the water ceasing to be attractive to the female mosquito.

The authors then dug small pits in which they planted numerous glass rods vertically. These rods were about as close as growing rice and offered a mechanical obstruction without shading the water or altering its chemical composition. It was found that the glass rods greatly reduced the number of visits paid by this species of mosquito for the purpose of laying eggs. Numerous eggs were laid in the control pit and also in the experimental pits when the rods were removed. Similar experiments were performed using rice plants growing in test-tubes, strips of bamboo, etc. The conclusion was confirmed that obstructions greatly reduced the number of eggs of *culicifacies* which are deposited, but that shade by itself has not this effect. Certain other species of *Anopheles* are much less reduced by the obstructions. The same principle is shown to hold good with shallow, open wells, access to which was partly obstructed by matting.

The authors of this very interesting paper point out that when the female *A. culicifacies* is laying her eggs, she hovers a few inches above the water without touching the surface. It seems possible that the

growing rice or the artificial obstructions interfere with this activity and in that way reduce the deposition of the eggs. *P. A. Buxton.*

THOMSON (R. C. Muirhead). **The Control of *Anopheles minimus* by 'Shade' and Related Methods.**—*Indian Med. Gaz.* 1942. Nov. Vol. 77. No. 11. pp. 675–676.

The author gives a brief summary of certain parts of his work on the biology of *Anopheles minimus* in Assam. The paper will serve to introduce this important subject to a wider series of readers. Among other points, he shows that whether *A. minimus* is controlled by shade or by clean weeding (and both methods have been used in practice), essentially the same thing is happening: for shade does not in itself repel the female mosquito when she is looking for a place to lay eggs, but it does kill the grass, and so destroy the little sheltered niches in which she would have laid them. In fact, both shading and removal of weeds operate by increasing the rapidity of the flow of the water.
P. A. Buxton.

RIGDON (R. H.). **A Consideration of the Mechanism of Death in Acute *Plasmodium falciparum* Infection; Report of a Case.**—*Amer. Jl. Hyg.* 1942. Nov. Vol. 36. No. 3. pp. 269–275. [18 refs.]

The author starts his paper with a discussion of the pathological lesions observed by himself and other authors in monkeys dying with *P. knowlesi* infection. He suggests that tissue anoxaemia is responsible for such lesions. The anoxaemia results from a rapid destruction of red cells and a high degree of parasitization of the remaining red cells. A temporary lack of oxygen causes increased capillary permeability. Resulting haemoconcentration may be such that the capillaries are tightly filled with cylinders of packed red cells. The clinical and pathological manifestations of anoxaemia are similar to those of shock: syndromes of adrenal insufficiency and toxaemia that have been described in malaria may have been manifestations of shock.

The author describes a case of a fatal uncomplicated *P. falciparum* infection in a child seven years of age, of whose body a complete post-mortem examination was made three hours after death. The pathological lesions found in this child are very completely described. They lend support to the above considerations. The lesions were in fact similar to those observed in cases of shock. It is noteworthy that the blood in the circulatory system was not coagulated three hours after death. It has been said that incoagulability of the blood is characteristic of shock. *Norman White.*

GONTAEVA (A. A.). **The Treatment and Prevention of Hypertoxic Tertian Malaria in Children.**—*Med. Parasit & Parasitic. Dis.* Moscow. 1942. Vol. 11. No. 3. pp. 126–129. [In Russian.]

Attention is drawn to the occurrence in various parts of central Russia of severe forms of benign tertian malaria among children between the ages of four and eighteen. The clinical picture of such cases is characterized by the sudden appearance of cerebral symptoms

accompanying the paroxysm of fever. The clinical manifestations progress rapidly and the disease terminates suddenly in death, usually before treatment can be started. As a rule, the histories of such patients point to B.T. malaria during the previous autumn and to relapse attacks in the current year.

The only method of dealing with such cases is immediate injection of acriquine [atebrin] or quinine, ready-made solutions of which must be available in localities where fulminating juvenile malaria is commonly observed. The dosage, according to age, is given in a table. For purposes of prevention, it is urged that malarial patients should undergo a full course of therapeutic and prophylactic treatment, to minimize the risk of relapses. *C. A. Hoare.*

SHAPKIN (L. A.). *Gambusia affinis* et *Leucaspius delineatus* dans la lutte contre les larves de l'*Anopheles*. [*G. affinis* **and** *L. delineatus* **in Larval Control.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 511–514. With 1 fig. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. pp. 25–26.]

Gambusia affinis holbrooki, which destroys Anopheline larvae, was introduced into the Province of Dniepropetrovsk (central Ukraine) from Abkhazia in 1934. It multiplied in the summer and survived the winter, but died out in most of the waters in spring, and a study was therefore made of the types of water in which it would thrive. The steppe rivers appeared to provide the most suitable conditions, since they are shallow and have a slow current, sloping banks, a muddy bed and abundant aquatic vegetation. Artificial reservoirs should be at least 40 ins. deep and protected from wind and should have sloping banks, submerged aquatic plants, a rich zooplankton, and a muddy bottom free from hydrogen sulphide; the presence of springs is desirable. Analysis of the stomach contents of these fish showed that they prefer animal to vegetable food, but are able to survive on protozoa and algae for an indefinite period. They were destroyed by pike and perch, but not by carp. Other natural enemies in the Province include the predacious bug, *Notonecta glauca*, L., which is present in numbers wherever *Gambusia* is abundant, and ducks. Since gravid females were common at water temperatures of 11–12°C. [51·8–53·6°F.], it is suggested that waters infested with Anopheline larvae should be stocked with *Gambusia* in April, so that the first brood would be produced in May. Superfluous aquatic vegetation along the banks should be removed, as it affords shelter to the mosquito larvae. As a result of breeding *Gambusia* under suitable conditions, it was available in large numbers in 1938, and over 600 acres of waters were stocked with it.

Leucaspius delineatus is the most effective of the local fish that feed on Anopheline larvae. Owing to the position of its mouth, it feeds on objects occurring at or near the surface of the water; it remains near the banks, where mosquito larvae occur, and is very active and voracious. It spawns from April to the end of June, and, unlike *Gambusia*, overwinters in any fresh water that does not freeze to the bottom. Some 25 acres of water were stocked with this fish in 1938. It was found that the most effective rates of release were 5 per 10 sq. ft. for *Gambusia* and 7–8 for *Leucaspius*.

RODHAIN (J.). Les plasmodiums des anthropoïdes de l'Afrique centrale et leurs relations avec les plasmodiums humains. [**Plasmodia of Central African Apes and their Relationship to Human Plasmodia.**]—*Ann. Soc. Belge de Méd. Trop.* 1940. Dec. 31. Vol. 20. No. 4. pp. 489–505. With 1 chart & 6 figs. on 1 plate.

In an earlier communication [this *Bulletin*, 1940, Vol. 37, p. 669], the author described experiments designed to throw light on the relationship of the three common human malarial parasites to the three similar, if not identical, organisms which occur in the blood of wild chimpanzees in West Africa. It was then concluded that *Plasmodium reichenowi* was distinct from *P. falciparum*, which it closely resembled. It was not inoculable to human beings and in culture revealed certain morphological peculiarities. Moreover, *P. falciparum* itself could not infect chimpanzees. *P. schwetzi* was not virulent for human beings and was probably distinct from *P. vivax*, which it resembled and which could survive for three or four weeks in the chimpanzee as an inapparent infection. Such survival was demonstrable not by the discovery of parasites in the blood but by inoculation of blood to susceptible paralytics. It was pointed out that the appearance of *P. vivax*-like parasites in the blood of a chimpanzee inoculated by MESNIL and ROUBAUD some years ago may have been due to stimulation of an unsuspected and latent *P. schwetzi* infection and not to the *P. vivax* which had been inoculated. As regards *P. rodhaini*, the quartan-like parasite of the chimpanzee, want of material prevented any attempt to inoculate this parasite to human beings. On the other hand two attempts to infect chimpanzees with *P. malariae* failed, but as the blood inoculated was not perfectly fresh it was impossible to draw any definite conclusion from this test.

The receipt in Belgium in 1939 of a new chimpanzee from the Belgian Congo afforded an opportunity of studying the question of *P. rodhaini*, for the ape, supposed to have a mixed infection of *P. reichenowi* and *P. schwetzi*, proved to have a triple infection of both these parasites and *P. rodhaini*. The last-named parasite was successfully inoculated to other chimpanzees and its cycle of development shown to occupy 72 hours. Morphologically it seemed indistinguishable from *P. malariae*. Though the inoculated chimpanzees were already chronically infected with *P. reichenowi* and *P. schwetzi* they revealed no cross-immunity to the new parasite. In another series of experiments *P. rodhaini* was inoculated from the chimpanzees to four general paralytics, all of whom developed infections indistinguishable from infections due to *P. malariae*. The strain established in human beings was successfully passed to other human beings. It is concluded from these experiments that the quartan-like parasite of the chimpanzee is identical with *P. malariae* and that the name *P. rodhaini* becomes a synonym of *P. malariae*. The experiment of inoculating *P. malariae* to chimpanzees needs to be repeated under more favourable circumstances—possibly in W. Africa. During the inoculations of the blood to human beings, in two cases the blood was taken from an ape which harboured *P. schwetzi* as well as the quartan-like parasite. With the appearance of *P. malariae* in the blood of the inoculated individuals there appeared also a parasite which morphologically resembled *P. vivax* and *P. schwetzi*. As noted above, all previous attempts to inoculate *P. schwetzi* to human beings had failed to produce any infection. The case was

complicated by the fact that this chimpanzee had been inoculated over two years before with *P. vivax* from man which had survived for some weeks, as demonstrated by inoculation of blood to other human beings. During the following two years it had not been possible to demonstrate any longer survival of *P. vivax*. It would seem probable therefore that the *P. vivax*-like parasite was actually *P. schwetzi*, and that unless one is prepared to admit that *P. vivax* can survive in the chimpanzee as an inapparent infection for over two years, certain strains of *P. schwetzi* may give rise to transient infection in man. *C. M. Wenyon.*

Gingrich (Wendell D.) & Fillmore (Rollin S.). **The Antimalarial Effect of Acranil in Birds.**—*Amer. Jl. Hyg.* 1942. Nov. Vol. 36. No. 3. pp. 276–282. With 2 figs. [28 refs.]

The authors have tested the action of acranil (3-chloro-7 methyoxy-9 diethylamine-β-hydroxy-propylamino-acridine dihydrochloride) on *Plasmodium cathemerium* infection in canaries and on *Haemoproteus columbae* infection in pigeons. The drug, a yellow dye, which has been used successfully for the treatment of lambliasis in man, proved to be as effective as atebrin for the parasite in the canary. It was without effect on the gametocytes of *P. columbae* in the pigeon. Its action on the malarial parasite, like that of atebrin, quinine and other antimalarials, is due to its power of reducing the number of mature schizonts or segmenters and the number of merozoites of those schizonts which reach maturity. Acranil is excreted or destroyed more rapidly than atebrin, hence the single dose is active in the body for a shorter time than the single dose of atebrin. The effective dose of acranil was toxic to canaries, but this toxicity was largely overcome by administering it in a 5 per cent. solution of gelatin.

C. M. Wenyon.

Hewitt (R. I.), Richardson (A. P.) & Seager (L. D.). **Observations on Untreated Infections with *Plasmodium lophurae* in Twelve Hundred Young White Pekin Ducks.**—*Amer. Jl. Hyg.* 1942. Nov. Vol. 36. No. 3. pp. 362–373. With 5 figs. [10 refs.]

In a previous paper [this *Bulletin*, 1943, Vol. 40, p. 222] the first author described the course of *Plasmodium lophurae* infection in 300 adult ducks of different breeds. In the present paper an account is given of the infection in 1,200 young ducks, 1 to 12 weeks old, and all belonging to a particular strain of the giant white Peking duck. The infections were produced by intravenous inoculation of blood drawn from the heart of an infected duck into an equal volume of citrated saline. The course of the infection was followed from day to day and the amount of blood haemoglobin determined. The influence of the age of the ducks and the dose of parasites on the character of the infection was noted with a view to the determination of the optimum conditions for testing chemotherapeutic agents. It was decided that for qualitative tests the best results were given by using ducks two weeks old inoculated with two billion parasites per kilogram of body weight, the parasites having been taken from a duck on the fourth or fifth day after inoculation. With this dosage of parasites the peak of the infection is reached on the 4th to the 7th day after inoculation. If parasite counts are made on these four days the peak of the infection will be included in nearly 100 per cent. of the birds. For quantitative

tests ducks six weeks old were used as these produce the most uniform infections. Furthermore, the older ducks show a higher mortality rate than the younger ones. By adhering to this standardized routine it has been possible to measure comparatively the action of known plasmodicidal drugs as well as that of several new compounds. [See also paper by MARSHALL, this *Bulletin*, 1943, Vol. 40, p. 223.]

C. M. Wenyon.

DEVINE (J.) & FULTON (J. D.). **The Pigment formed by *Plasmodium gallinaceum* Brumpt, 1935, in the Domestic Fowl.**—*Ann. Trop. Med. & Parasit.* 1942. Dec. 31. Vol. 36. No. 4. pp. 167–170.

By methods similar to those by which the authors investigated the nature of the pigment produced by *Plasmodium knowlesi* in the blood of the monkey [this *Bulletin*, 1942, Vol. 39, p. 438] they have studied the pigment of *P. gallinaceum* in the blood of the fowl. The infected cells were lysed by distilled water instead of by saponin, used in the previous work, as this proved unsatisfactory for the bird parasite. Attempts were made to free the pigment from protein by peptic digestion, but though some was removed much remained undigested. The spectroscopic and chemical investigations showed that the pigment, as in other cases, is haematin. This is the first time that the exact nature of the pigment produced by a malarial parasite of birds has been determined.

C. M. Wenyon.

BLACKWATER FEVER.

MAEGRAITH (Brian), FINDLAY (G. M.) & MARTIN (N. H.). **Mechanism of Lysis of Red Blood Cells.** [Correspondence.]—*Nature.* 1943. Feb. 27. Vol. 151. No. 3826. pp. 252–253.

From a study of the aetiology of blackwater fever the authors have gone on to examine the wider problem of red cell destruction in the body. They have observed that slices of certain tissues will lyse saline suspensions of washed red cells, but only if those tissues have first been thoroughly washed in saline; they do not lyse unwashed red cells. Lysis can be prevented by addition of animal serum to the mixture (even heterologous serum, within a definite zone of dilution), by the addition of sodium cyanide (to 1 in 20,000,000) or mercuric chloride (to 1 in 32,000), or by heating the tissue slices to 80°C. The lytic agent appears to be species specific, but the serum inhibitor is not.

The lytic agent would seem to be an enzyme, though this has not been proved; this apparently exists in the animal body, but is held in check by an inhibiting substance present in tissues and serum. Abnormal lysis, as in blackwater fever, may therefore be due to interference with the activity of the inhibitor.

C. W.

LEISHMANIASIS.

BOBROV (M. V.). **On the Treatment of Cutaneous Leishmaniasis with Blood-Dressings.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1942. Vol. 11. No. 3. pp. 90–92. [In Russian.]

The author describes the application of blood-dressings in the treatment of cutaneous leishmaniasis (Pendeh Sore), as used by him in Central Asia.

On admission the patients usually had ulcers covered with various ointments or antiseptics. These were carefully removed from the lesion, leaving a clean surface. From 5 to 10 cc. of blood were then taken from the patient with a syringe ; a cloth was copiously soaked in the blood, and applied to the sore. The dressing was usually changed next day and subsequently every fourth or fifth day. As a rule, ulcers which are at first covered with flabby, anaemic granulation tissue and have a purulent discharge, or a crust, become unrecognizable after two blood-dressings : the granulation crust is readily detachable, there appear fresh proliferating granulation elements which fill the entire cavity of the ulcer and are sometimes accompanied by formation of epithelium.

If the healing had been progressing satisfactorily, in later dressings blood was substituted by cod-liver oil.

On the average the ulcers healed after 5–6 blood-dressings, the duration of the treatment being from 2 to 3 weeks. The total amount of blood required varied from 50 to 100 cc., the loss of which had no harmful effect upon the condition of the patients. Sores complicated by thrombophlebitis and lymphangitis were not amenable to treatment with blood-dressings.

This method of treatment of cutaneous leishmaniasis is recommended not only on account of its effectiveness but also because, in view of its simplicity, it can be employed under various conditions by inexperienced medical personnel.

[It will be remembered that Pendeh sore is the moist type of comparatively short duration, which LATYSHEV and KRIUKOVA (this *Bulletin*, 1943, Vol. 40, p. 296) differentiate from the more chronic Ashkhabad sore.] *C. A. Hoare.*

BELTRAN (Enrique) & BUSTAMANTE (Miguel E.). Datos epidemiologicos acerca de la " ulcera de los chicleros " (leishmaniasis americana) en Mexico. [**Epidemiological Notes on Gum Collectors' Ulcer (American Leishmaniasis) in Mexico.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. Mar. Vol. 3. No. 1. pp. 1–28. With 4 maps (1 folding) & 6 figs. [18 refs.] English summary.

Cutaneous leishmaniasis was first recorded from the Yucatán peninsula by SEIDELIN in 1912. Since that time a number of investigators have described the disease and the circumstances of its occurrence in this part of Mexico. In the present paper an account is given of a more extended study of the condition. The disease occurs in the forests which cover roughly three-quarters of the peninsula, leaving the north-western quarter as cleared agricultural land in which, apparently, leishmaniasis is not present. The persons afflicted are the *chicleros* or gum collectors, consisting of groups of men, women and children who live in the forests for varying periods—but most usually during the autumn. The enquiry carried out by inspection and

questionaries showed that among 1,506 individuals, 169 suffered from the disease. Some of these were old cases, for of the total, 71 cases only had occurred during the year of enquiry. The lesions are found most commonly on the ears or arms and usually only a single one is present. In the 1,506 persons examined, 17 per cent. of the men, 2 per cent. of the women and 0·7 per cent. of the children were affected. The disease commences most commonly during the six months August to January. There is no available information as to the method of infection. *C. M. Wenyon.*

NEHAUL (B. B. G.). **Dermal Leishmaniasis.**—*Caribbean Med. Jl.* 1942. Vol. 4. No. 3. pp. 101–103. With 1 plate.

The case described is that of a male aboriginal Indian, 54 years of age, of Demerara, British Guiana, who was suffering from lumps and ulcers on the right arm. The lumps or nodules were in the subcutaneous tissue. The skin over many of these was easily movable but in others it was adherent and had become smooth and shiny. Elsewhere the skin had broken down and granulomatous ulcers had formed. The spleen was slightly enlarged, as also were axillary and inguinal lymphatic glands. In serum expressed from the nodules or ulcers leishmania were discovered. Treatment by intravenous injections of 2 per cent. solution of tartar emetic in doses of 2·5 cc. twice a week for eight weeks was followed by some improvement, the nodules becoming smaller and the ulcers beginning to heal. *C. M. Wenyon.*

REY (Florentino). Aislamiento de tres cepas de leishmania. [**Isolation of Three Strains of Leishmania.**]—*Rev. Facultad de Med.* Bogotá. 1942. Aug. Vol. 11. No. 2. pp. 103–106. With 4 figs. on 3 plates.

The paper records the isolation in culture of three strains of *Leishmania brasiliensis* from three cases of cutaneous leishmaniasis in Colombia. *C. M. Wenyon.*

FEVERS OF THE TYPHUS GROUP.

FRÓES (João A. G.). Febres do grupo tifo exantemático. [**Fevers of the Typhus Exanthematicus Group.**]—*Brasil-Medico.* 1942. Nov. 7 & 14. Vol. 56. Nos. 45 & 46. pp. 503–508. With 1 chart.

This racy lecture shows how the subject can be simplified and clarified by regarding the typhus-like fevers as being essentially similar from the clinical point of view and as comprising distinct epidemiological types according to the vectors concerned in transmission.

The classification adopted by the author is: (1) European or louse typhus; (2) flea and louse or Mexican typhus; (3) tick or Indo-American typhus; (4) mite or Japanese typhus; and (5) typhus of uncertain vector. *John W. D. Megaw.*

PLOTZ (Harry). **Complement Fixation in Rickettsial Diseases.**—*Science.* 1943. Jan. 1. Vol. 97. No. 2505. pp. 20–21.

By the use of a new technique the complement-fixation test has been successfully used to differentiate epidemic typhus from the endemic type of the disease. Details of the method of preparing the new antigen are promised : the material used is obtained from the yolk sacs of infected chick embryos and the antigens are standardized against convalescent sera of known titre from human beings and guineapigs recovered from epidemic and endemic typhus. The tests were made on convalescents from epidemic and endemic typhus and Brill's disease. The results are summarized as follows :—

Disease	Epidemic Rickettsial antigen	Dilution	Endemic Rickettsial antigen	Dilution
Endemic typhus (43)	34 negative 9 positive	1–6 to 1–24	All positive	1–12 to 1–384
Epidemic typhus (29)	All positive	1–12 to 1–768	26 negative 3 positive	1–24 to 1–96
Brill's disease (23) ...	All positive	1–12 to 1–1,436	10 negative 13 positive	1–6 to 1–384

In every case in which cross fixation occurred the specific antigen reacted with the homologous serum in a higher titre than with the heterologous serum. The difference in titre was usually great.

Absorption tests were made on sera from cases of Brill's disease in which cross fixation occurred : endemic antigen removed all the endemic antibody but little of the epidemic antibody ; epidemic antigen removed both the epidemic and endemic antibody.

These serological findings support ZINSSER's view that Brill's disease is of the epidemic type and that it is not transmitted from man to man simply because lice are not present [this *Bulletin*, 1935, Vol. 32, pp. 154, 563. It will be remembered that Zinsser regarded Brill's disease as a recrudescence or relapse of true typhus originally contracted in Europe. Many of the people, mostly Polish Jews, who have developed Brill's disease, have been in New York 10–30 years.] The observations strongly suggest that man serves as the reservoir for epidemic typhus between outbreaks just as the rat does in endemic typhus. By applying the new test endemic typhus has already been discovered in Jamaica and epidemic typhus in a South American country. Other surveys are being made.

In the text the results in the 43 cases of endemic typhus are stated as 36 negative to the epidemic antigen and 6 positive.

John W. D. Megaw.

RÉMOND (Martial). L'alimentation des indigènes et le typhus exanthématique. [**The Diets of Indigenous Populations and Typhus Fever.**]—*Arch. Inst. Pasteur d'Algérie.* 1941. Sept. Vol. 19. No. 3. pp. 336–338.

The author, who is an experienced administrator, was asked by Ed. SERGENT and PARROT whether he could suggest any reason for the

peculiar distribution of typhus in Algeria. His reply is contained in this note. In the Kabylia region, where the disease occurs only in occasional outbreaks due to imported infection, the people are well nourished, their diet is well supplied with proteins, carbohydrates, fats and vitamins. On the other hand, in the high plateau of Constantine, where the disease is endemic and often widespread, the people depend chiefly on their crops of barley, and these are liable to fail in seasons of drought such as that of 1940. Their diet is, on the whole, inadequate and deficient in animal proteins, fats and vitamins.

These general observations support the view of Sergent and Parrot that the problem of louse-borne typhus is not simply one of lice but of lice associated with inadequate and deficient diet.

Two other possible factors are mentioned by the author :—the heavily infected area is at an altitude of 800 to 1,200 metres and many of the inhabitants are semi-nomadic. *John W. D. Megaw.*

CHIARI (Hermann). Zur pathologischen Anatomie des Fleckfiebers. [**The Pathological Anatomy of Typhus Fever.**]—*Wien. Klin. Woch.* 1942. Nov. 27. Vol. 55. No. 48. pp. 946–948.

The paper deals only with acute cases in which death occurred between the 8th and 15th days, but a large number of these were available. Naked eye examination revealed changes which appear non-specific though it corrected such clinical diagnoses as " acute abdomen," gastro-enteritis and infective angina. The rash was still evident in many cases and was often observed on the palms but not on the soles. Congestion of the brain cortex and meninges was a prominent feature. The lungs were dark-red and congested ; sometimes there were ecchymoses in the pleurae. The heart was flabby and greatly distended with dark-red blood, the myocardium was friable. The spleen was always enlarged, often weighing 500 grammes ; it was soft and therefore not easily palpable during life. The spleen pulp was dark-red, greatly congested, and haemorrhagic. Catarrhal colitis, especially of the caecum, was common. The testicles were often swollen and oedematous. The muscles had a dried-up appearance. The Weil-Felix reaction was often strongly positive even after death.

The histological changes were specially associated with the smaller arteries but were not strictly of the " periarteritis nodosa " type that is usually described. The condition was one of band-like infiltration surrounding the vessel like a sheath, the extreme necrotic changes so often mentioned were not seen, though swelling of the intima and thrombus formation were frequent. The perivascular infiltrates consisted chiefly of lymphocytes with a few polymorphonuclear cells ; proliferation of the adventitial and endothelial cells occurred and there was sometimes also a certain amount of necrosis of the intima. Escape of blood from the damaged vessels is the basis of the petechiae. The vascular lesions were prominent in the brain, heart, testicles, stomach, and intestines. In the heart they caused focal patches of interstitial myocarditis ; the cell infiltrations consisting of macrophage cells, lymphocytes and a few polymorphonuclears. In the brain the most pronounced lesions were in the medulla and pons ; in addition to the changes seen in the small vessels there were nodular patches of proliferation of the glia cells. *John W. D. Megaw.*

Laurentius (Paul). Über Kreislaufbefunde bei Fleckfieber. [**Cardiovascular Findings in Typhus Fever.**]—*Deut. Med. Woch.* 1942. Dec. 4. Vol. 68. No. 49. pp. 1187–1189. With 4 figs. [14 refs.]

Disturbances of the peripheral circulation occur early in typhus fever : in severe cases pallor of the skin, coldness of the extremities, slight cyanosis, and low blood pressure may be observed as early as the third day and may justify an early diagnosis before the appearance of the rash. They are explained by damage to the vasomotor centres caused by the formation of nodules in the small blood vessels. Myocardial lesions play an important part later on but do not account for the early manifestations.

In severe cases the electrocardiograph may give indications of myocardial damage from the third or fourth day onwards : the findings are of the same type as those seen in diphtheria. A flattening of the T wave on leads I and II gives the earliest indication of a pathological change ; later the wave becomes diphasic or inverted in some cases. Other changes in the electrocardiograms are described and illustrated. The return of the curve to normal usually takes two or three months and until it is fully established exertion must be strictly forbidden. The special value of the electrocardiograph is that it often shows indications of abnormality during and after the illness when there is no other evidence of cardiac insufficiency : it is the best guide to treatment and also to the fitness of the patient for further active service.

Lampert's recommendation of hot baths in treatment is criticized : It is based on the assumption that death is caused by collapse of the peripheral circulation rather than by damage to the heart muscle. The author stresses the importance of the latter factor and holds that hot baths should not be given in cases of failing circulation though they are useful after the successful use of a course of drugs like " sympatol ", " cardiazol " and camphor. Caffeine is useful. Saline infusions are of value, especially in cases of tissue dehydration and falling blood pressure. Strophanthin in moderate doses cannot be dispensed with until a truly specific treatment by chemotherapy or immune serum is available. *John W. D. Megaw.*

Sylla (Adolf). Ursachen, Verhütung und Behandlung der Gliedmassengangrän beim Fleckfieber. [**The Causation, Prevention, and Treatment of Gangrene of the Limbs in Typhus Fever.**]—*Deut. Med. Woch.* 1942. Dec. 4. Vol. 68. No. 49. pp. 1185–1186.

Gangrene in typhus is usually restricted to small areas, but occasionally is extensive and may necessitate amputation of one or both legs. Coldness and blueness of the feet and unexplained sudden attacks of pain in the legs are warning signals ; usually there is also a further rise in the temperature. The onset is commonly about the 11th to the 13th day. The pulse in the dorsalis pedis artery is feeble or absent. Thrombosis is restricted to the small vessels, though in rare cases the large arteries may be involved : the large veins are never thrombosed. In 10 per cent. of the cases there is actual stenosis of the arteries. Spasm of the vessels is believed to play the chief part ; by some this is regarded as being due to the formation of nodules in the vessels of the vasomotor centres of the brain, but this cannot be a complete explanation because the condition so often follows exposure of the limb to cold and is rarely seen in warm weather. Prevention

consists chiefly in keeping the ward warm and in seeing that the patient's limbs are kept covered by the blankets. When the feet are cold and the dorsalis pedis pulse is feeble, dry heat should be applied and the limbs should be wrapped in cotton wool. Pain caused by spasm of the arteries is relieved by " padutin." When thrombosis has occurred large doses of this drug are essential ; two or three ampoules are given four times daily, and the dose may have to be doubled if prompt relief does not follow. Doses of 25 milligrammes of " testoviron " or of 50,000 units of " progynon " are useful if given early. When gangrene has set in the sympathetic block is carried out with ½ per cent. novocaine (without adrenalin) of which 75 cc. are given by paravertebral injection, and 200 cc. proximal to the affected part. If the circulation is restored these injections are repeated on the two following days. When gangrene is established the line of demarcation is awaited and amputation carried out. *John W. D. Megaw.*

Mihaljevič & Radičev. **The Blood Picture in Typhus.**—*Lijecnički vgesnik.* Zagreb. 1942. July. No. 7.

The following is a translation of a German abstract of the paper dealt with :—

The blood picture is characteristic and important for prognosis. At the start the white corpuscle count is somewhat raised and tends to increase during the disease especially in severe cases [but] leukocytosis is often [followed by] a sudden drop of the leucocyte count. [The abstract is over-compressed at this point.] There is usually neutrophilia with a shift to the left, and a hyper-segmentation with pathological nuclear forms. [Note that if there is a shift to the left, hyper-segmentation may still occur but it will affect only a few cells. These will be of the so-called macropolycyte type which may be found in up to 3 per cent. in certain tropical diseases.] After a few days of lymphocytosis, there will be an equally short period of lymphopenia but finally there is " convalescent lymphocytosis." During the early lymphocytosis, typical large lymphocytes are found [probably the pathological lymphocytes of Osgood]. The monocytes increase [relatively] with the leucocytosis and decrease during the leucopenia. Eosinophilia usually starts during convalescence. Cases with white counts above 20,000 have a bad prognosis, as do those with a progressively increasing count. One must regard seriously those cases in which there is a marked qualitative change in the blood picture and any in which the peripheral blood contains definite plasmocytes, numerous histiocytes and endothelial cells. *W. P. Kennedy.*

Windorfer (A.). Ueber besondere Verlaufsform des Wolhynienfiebers bei der Truppe. [**Peculiar Types of Trench Fever in the Troops** [**German**].]—*Deut. Med. Woch.* 1942. Nov. 20. Vol. 68. No. 47. pp. 1144–1146.

From the end of January a number of soldiers in a section of the middle part of the eastern front began to complain of " rheumatic " pains in the legs accompanied by low fever. Avitaminosis was first suspected but could be excluded ; then the trouble was thought to be either a complication of influenza or a specific infection. A clue to the diagnosis was found in a passage from the official Handbook for Military Doctors : this was " boring pains in the legs are a cardinal symptom of trench fever ".

About 50 cases were seen and all but one of these differed strikingly from the standard descriptions in which emphasis is laid on the occurrence of sharp febrile paroxysms at five-day intervals. In the exceptional case this feature was pronounced. The usual symptoms were: severe pains in the shin bones, bearable by day but becoming so severe at night that their comrades were kept awake by the groans of the victims. The pains were increased by warmth and when the patients were lying down; the temperature was 37·2°C. to 37·5°C. in the morning and 37·6° to 37·9° in the evening. After a few days the pains often shifted to the knees and thighs or wandered from one site to another in the lower extremities; they were sometimes referred to the joints, sometimes to the muscles, and often returned again to the shin bones. They persisted day after day without the periods of respite that are regarded as characteristic of the disease. The average duration was nine days, the range being from one to two weeks. Eight of the patients had single recurrences lasting eight to fourteen days after periods of freedom of two or three weeks. There were also some abortive attacks lasting three or four days in which there was little or no fever and the patients remained on duty.

Objectively there was little or nothing to see except that the patients looked pale and depressed. A few had slight tenderness over the shin bones; some had a tender point over the middle of the front edge of the tibia. Movement of the affected joints was not impaired.

Aspirin and pyramidon often gave relief, sometimes morphia was needed, but even this occasionally failed. Only the worst cases were admitted to hospital; most of the patients were given indoor duties which helped to distract their attention.

Malingering could usually be excluded by the slight rise in temperature and the special severity of the pains at night. The military importance of the disease consisted only in the temporary period of disablement. *John W. D. Megaw.*

Jiménez-Martínez (Pedro). Consideraciones epidemiologicas sobre el foco Santandereano de fiebre petequial. [**An Epidemiological Study of a Focus of Petechial Fever (Tick-borne) in Santander (Colombia).**]—*Rev. Facul. de Med.* Bogotá. 1942. Oct. Vol. 11. No. 4. pp. 183–194.

The typhus fever of Colombia was long regarded as a variety of typhoid. In 1922, Patiño Camargo first described "tifo negro en Bogotá"; he isolated the virus by inoculating the blood of patients into guineapigs and transmitted the infection to guineapigs by the bites of lice which had been fed on patients. The virus caused no scrotal reaction and the mortality in experimental animals was low.

In 1935 the same worker described a new kind of typhus, the "petechial fever of Tobia," as a Rickettsial disease transmitted by *Amblyomma cajennense* and other ticks. This disease was also observed in Bogotá, Nariño and other places in Colombia.

Late in 1941 and up to the middle of 1942 an identical fever was observed in three localities in Santander, where the disease must have existed for many years without being identified. The disease occurred in sharply restricted foci consisting usually of one or two huts occupied by agricultural workers and swarming with blood-sucking arthropods of many kinds. The residents of the huts often died in rapid succession

after an illness of about eight days, in which the clinical features were those of very severe tick-borne typhus of the Rocky Mountain type.

The first case investigated occurred in December. Blood from a patient in the acute period of his illness was inoculated intracerebrally into mice and intraperitoneally into guineapigs. The mice showed no reaction and the guineapigs responded in a very indefinite way and had no scrotal reaction ; further passages were made in guineapigs and in these there was always a typical febrile and scrotal reaction. Rickettsiae were isolated and injected into two rhesus monkeys which developed fever after an incubation period of five days and died 24 hours later. Cross immunity tests showed that the Rickettsiae were immunologically identical with those of the petechial fever of Tobia and the Rocky Mountain spotted fever. The disease was experimentally transmitted from animal to animal by the bites of *A. cajennense.*

The conditions of occurrence suggested domestic transmission by vectors which had inherited the infection or had acquired it from animal reservoirs (possibly small rodents).

In another case the blood of a patient caused typical febrile and scrotal reactions in guineapigs directly inoculated.

In the whole Santander region there were 37 cases, of which 35 were fatal, between November 1941 and June 1942. Of the 37 cases 25 were in small family outbreaks, in which two to five persons living in the same hut were attacked, sometimes in rapid succession, but sometimes at long intervals. In one hut four persons were attacked at intervals of 52, 46 and 91 days, in another, two cases occurred simultaneously 61 days after the death of the first patient ; in another hut second and third cases occurred at intervals of 6 and 4 days, respectively.

Seven foci were detected and there must have been many others in the department of Santander. The general conclusions were that the disease is transmitted to man by ticks, that there is no tendency to generalized epidemics, that the disease is essentially rural, and that it is specially frequent in the hot season. *John W. D. Megaw.*

PARKER (R. R.). *Ornithodoros* **Ticks as a Medium for the Transportation of Disease Agents.**—*Public Health Rep.* 1942. Dec. 25. Vol. 57. No. 52. pp. 1963–1966.

Two ticks, *Ornithodorus turicata* and *O. parkeri,* have already been shown to be capable of harbouring for long periods (216 to 1,001 days) certain disease agents of which they are not known to be spontaneous hosts or transmitters.

In the present note examples are given of the successful transportation of two species of Rickettsiae and one virus by ticks of the genus *Ornithodorus.*

In September 1940 seven specimens of *O. rudis* were fed in Colombia on guineapigs infected with Tobia petechial fever (Colombian spotted fever) and were sent by air to the Rocky Mountain Laboratory in Montana. Six were alive on their arrival ten days after the infecting feed. Rickettsiae were isolated from two of the ticks by intraperitoneal inoculation of suspensions into guineapigs and both strains showed complete cross immunity with the virus of Rocky Mountain spotted fever. Two ticks examined in the same way on the thirteenth day after feeding were negative. The remaining two ticks were used for feeding experiments on guineapigs but the results were negative, though one of these ticks was shown to be still harbouring the virus 53 days after the original infecting meal.

On April 3rd, 1941, J. H. S. Gear despatched from Johannesburg, S. Africa, ticks which had fed on a guineapig infected with tick bite fever; they arrived in Montana on May 9th. Five were nymph *O. turicata* which had been sent from Montana on October 17th, 1940, all of these were negative; five were *O. moubata* bred in S. Africa, of these one nymph and two adult males were negative but the Rickettsia was isolated from suspensions made from two adult females which had made their infecting meal about 36 days earlier. The Rickettsia caused typical fever and scrotal reactions in two guineapigs and was found by cross immunity tests to be evidently closely related, if not identical, with the virus of boutonneuse fever. None of the nymphs of *O. parkeri* sent from Montana to South Africa survived.

The virus of spring-summer encephalitis was recovered from two adult specimens of *O. moubata* which had fed 40 days previously on infected mice in Moscow. Specimens of larval *Ixodes persulcatus*, the native transmitting agent, were not infective to mice into which they were inoculated. *John W. D. Megaw.*

van den Ende (M.), Stuart-Harris (C. H.), Harries (E. H. R.) & Steigman (A. J.). **Laboratory Infection with Murine Typhus.**—*Lancet.* 1943. Mar. 13. pp. 328–332. [13 refs.]

The accidental infection of twelve persons with murine strains of typhus is described and discussed. In one laboratory attacks occurred in five of seven workers engaged on experiments with murine virus, in the course of which mice were inoculated intranasally. Each of the seven workers had been inoculated recently with one course of three doses of the Castañeda type of rat lung vaccine made of killed murine Rickettsiae; six had also two courses, and one a single course, of a Cox type of yolk sac vaccine made of killed epidemic typhus Rickettsiae. Each of the six workers received 6·75 cc. of vaccine.

In the other laboratory (military) five of seven workers engaged on similar kinds of experiments with murine virus were attacked; another worker who was not engaged in the experiments but only visited the laboratory for half an hour daily was also attacked. All had recently been vaccinated with a course of four injections of the Cox type of vaccine (3 cc. altogether for each person) and each had a further " recall " dose of 1·0 cc. with the exception of the worker who took no part in the experiments. One other worker in this laboratory was attacked, but in somewhat different circumstances; he also had been vaccinated.

The workers in the military laboratory had also been exposed to risk of infection by an epidemic strain of virus, but in conditions which made it unlikely that they were infected with this strain and their attacks were similar to those of the workers in the other laboratory, who had handled only the murine strain.

Precautions in both laboratories included the wearing of rubber gloves and gauze masks, and keeping the mice in a glass box while the inoculations were being carried out. The outbreaks in both laboratories began soon after the intranasal inoculations were started. Experiments with *Chr. prodigiosum* showed that large numbers of the organisms were disseminated into the air while suspensions were being inoculated intranasally into mice and for at least 45 minutes afterwards. Inhalation of droplets was, therefore, regarded as the chief method of infection, though infected dust may have been responsible in one case.

Seven of the patients were admitted to hospital; the attacks were moderately severe in three and mild in four. The onset was definite but was often followed by a period of a few days in which the symptoms were indefinite. The fever was remittent or intermittent and usually lasted 10 to 14 days. An obvious rash was seen in only three cases; it was macular, never petechial, and was restricted to the trunk except in one case in which there was a slight extension to the arm. The spleen was palpable in five, but sometimes not till the end of the fever. One patient had distressing tachycardia during convalescence; he was incapacitated for six months. Four of the five other patients had ambulant attacks; there was slight fever in two; headache lasting four to twelve days was the chief symptom.

The difficulty of early diagnosis of cases without rash is great, even with complete laboratory investigation. Weil-Felix tests were not helpful during the first week, as is shown by the following table:—

Titres of Proteus OX 19 *Agglutinins.*

The signs −, ±, +, indicate the result of the test; the figures give the dilutions used.

Subject	Previous to onset	Days after onset of disease											
		2	4	5	7	9	10	11	12	15	18	19	33
A ...	+20			+20	+60				+640				
E ...		−20	−20		±20		+40				+80		
F ...				+25					+160			+500	
B ...	−25											+125	
M ...	−40			+20		+35				+40		−40	
S ...	−40				+40			+80		160		+160	+80

In five cases unsuccessful attempts were made to recover Rickettsiae from the blood at an early stage by guineapig inoculation. Lice which were fed on a patient during the stage of the rash remained uninfected. These negative results may have been due to partial immunity resulting from vaccination, but cases are on record in which the virus has been recovered from patients in similar conditions.

Leucocyte counts up to the eighth day showed a distinct tendency to neutropenia in all but one of seven patients, and moderate or pronounced monocytic increase was usual; the relative monocyte count ranged from 8 to 21 per cent. in ten counts made on or before the eighth day on seven patients, though in one case it was only 5 per cent. on the fourth day but 12 per cent. on the eighth.

[These and the numerous other reported cases of laboratory infection prove that killed vaccines as now used do not confer complete immunity; at the same time they suggest that a substantial degree of partial immunity may result, and that any subsequent attacks of louse-borne typhus in recently vaccinated persons are not very likely to be infective to lice.] *John W. D. Megaw.*

YELLOW FEVER.

Fox (John P.) & Cabral (Antonio S.). **The Duration of Immunity following Vaccination with the 17D Strain of Yellow Fever Virus.**—*Amer. Jl. Hyg.* 1943. Jan. Vol. 37. No. 1. pp. 93–120. With 11 figs. [32 refs.]

After the field trials with 17D vaccine in 1937 showed this strain of yellow fever virus to be safe and efficient for large-scale human immunization [see this *Bulletin*, 1939, Vol. 36, pp. 648–649], the most important question remaining to be studied was the duration of the immunity produced by this vaccine. A considerable amount of experimental and field observation justifies the conception that in yellow fever the presence of virus-neutralizing antibodies in the blood serum in quantities detectable by mouse protection tests is evidence of effective immunity. Up to the present the most extensive study of immunity following vaccination against yellow fever is that by Sawyer, which deals with the old method of employing immune serum and neurotropic virus [see this *Bulletin*, 1936, Vol. 33, p. 622]. He found that persons so vaccinated responded with a quick rise in serum-antibody titres, which reached their peak during the first six weeks and then gradually fell, following a curve which had reached a nearly stable horizontal level four years after vaccination, This level, however, was found to be somewhat lower than that observed among persons whose immunity had resulted from attacks of naturally acquired yellow fever. The duration of immunity following infection with 17D virus has previously been studied on a small scale only. Smith, Penna and Paoliello [this *Bulletin*, 1939, Vol. 36, pp. 648–649] showed that the peak level of serum antibodies is usually reached by the twenty-eighth day. They further reported a definite drop in serum-antibody level at the end of one year among a group of twenty-two persons tested. The authors of this paper have set forth a considerable volume of data on the immunity status of groups of persons inoculated at varying intervals up to four years.

The persons included in the present study were selected on the following basis: (*a*) a known or reasonably presumed non-immune state prior to vaccination: (*b*) vaccination with 17D virus; (*c*) the subsequent development of at least some degree of immunity as determined by the examination of a serum sample collected soon after vaccination; (*d*) the availability of some portion of the first post-vaccination serum sample for re-examination; and (*e*) the establishing of satisfactory identification at the time of re-bleeding. Altogether, studies on 926 persons are reported.

The standard intraperitoneal test in mice, as reported by Sawyer and Lloyd [this *Bulletin*, 1932, Vol. 29, pp. 198–199], was used in the first examination of most of the sera. Routinely, six mice of 35–49 days of age are inoculated with each serum tested. The result is expressed as the ratio of the number of mice alive on the tenth day to the number of mice which were alive on the fourth day after inoculation. Conventionally ratios of 0/6, 1/6 or 2/6 have been considered as negative, of 3/6 or 4/6 as inconclusive, and of 5/6 and 6/6 as positive. It has been found that with post-vaccination results, at least, this interpretation is much too rigorous. Even in instances in which the ratio is 0/6 but the deaths of the mice are delayed, re-examination in a more sensitive test often reveals clearly demonstrable neutralizing capacity, while with results of 1/6 and 2/6 this is the general rule.

For the careful re-examination of the entire group of sera, therefore, a protection test recently devised by WHITMAN was used (manuscript in press). Whitman showed that mice up to 21 days of age are much more susceptible to intraperitoneal doses of neurotropic yellow fever virus than are older mice. For this test mice between 17 and 21 days of age are used. Only a small quantity of serum is necessary and the sensitivity of the test can be adjusted by using mice of different ages (the younger ones being more susceptible), by varying the concentration of the test virus, or by altering the proportion of serum to virus suspension in the inoculum. It was found that the sensitivity of this " young mouse test " could be made to approximate that of the " standard test " of Sawyer and Lloyd, if 19-day-old mice were given an intraperitoneal inoculum of 0·06 ml. per mouse, composed of 0·04 ml. of the serum being tested, and 0·02 ml. of a 20 per cent. suspension of infected mouse brain.

Since many of the sera to be tested had been stored for long periods, in ampoules, an experiment was carried out to determine the possible importance of antibody deterioration. During the nine-month period over which this experiment was conducted, no significant differences could be detected between the antibody titres of three test sera kept in sealed ampoules and samples of the same sera preserved in desiccated form.

Since the persons included in the study were inoculated with four different sub-strains of 17D virus, they were divided into groups on the basis of the sub-strain received. Three of the sub-strains are designated as " low," *i.e.*, they had been passaged in tissue culture between 220 and 255 times. The fourth sub-strain of virus had been passaged in tissue culture for a considerably longer period. Vaccines prepared from it came from material of the 315th to 385th subcultures. These sub-strain groups were then re-divided on the basis of the approximate post-vaccination interval at which later serum specimens were collected.

The results obtained in the mouse tests on the sera showed certain differences in the duration of immunity produced in several of the vaccination groups. With respect to the virus sub-strains the data are most significantly different for the high sub-culture groups. SOPER, SMITH and PENNA [Third Internat. Congr. for Microbiol., 1939, Report of Proc., pp. 351–353] have previously reported that this sub-strain had lost some of its antigenicity and produced poor immunity results in the field. It is assumed that the more rapid loss of antibodies in individuals vaccinated with this sub-strain is to be correlated with its inferior antigenic character.

The evidence available indicated that the differences found among the " low " sub-strain groups were due, not to previously unrecognized differences in the antigenicity of the 17D sub-strains concerned, but to the different age compositions of the vaccination groups. The detailed analysis of the results by age revealed a well-marked correlation between age and immune levels, measured one month after vaccination and at later intervals, particularly low levels being found in sera from persons of less than ten years of age at the time of vaccination. It thus seems probable that age may be an important factor in determining both the immediate immune response and the subsequent duration of immunity in persons vaccinated against yellow fever.

The authors conclude that it would appear that vaccination of adult populations with a virus of established antigenicity results in a persistence of an immune state which is clearly satisfactory from the

group standpoint for at least four years, and probably for much longer. In children, after vaccination, the level of protective antibody does not rise so high as in adults and tends to fall more rapidly.

Sera which showed no protective action in the routine mouse tests were re-examined by a more sensitive technique. By this means detectable antibodies were revealed in 61·8 per cent. of the 139 sera re-examined. While even more sensitive tests might reveal the presence of antibodies in some of the remaining sera, these observations suggest that serologically demonstrable immunity against yellow fever, induced by living 17D virus, may completely disappear in at least some cases. *Hugh H. Smith.*

Bustamante (Miguel E.), Kumm (Henry William) & Herrera (Julio Roberto). Ausencia de fiebre amarilla en el Valle del Usumacinta (Guatemala y Mexico, 1942). [**Absence of Yellow Fever in the Valley of the Usumacinta, Guatemala and Mexico, 1942.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. Dec. Vol. 3. No. 4. pp. 255–271. With 2 maps (1 folding) & 14 figs. on 4 plates. English summary.

During April and May 1942 an international Commission, made up of representatives of the National Health Departments of Mexico and Guatemala and a staff member of the Rockefeller Foundation, undertook an investigation along the valley of the Rio Usumacinta, which lies in the Yucatán Peninsula. The main objective of the Commission was to collect blood specimens for yellow fever immunity tests, but some studies were made of the mosquitoes along their route and observations on the prevalent human diseases were made and are reported. The Usumacinta Valley, which appears to offer favourable conditions for the occurrence of jungle yellow fever, had not been included in the immunity survey carried out in Mexico and Central America in 1932, 1934 and 1936 by Sawyer, Bauer, and Whitman [see this *Bulletin*, 1937, Vol. 34, p. 680].

A total of 806 individuals were bled, the sera being sent to the Laboratories of the International Health Division of the Rockefeller Foundation in New York City for the mouse protection test. The persons selected were those who had never moved away from the region and who were most likely to have had intimate contact with the forest. All ages from four years upwards were included, though the great majority were under twenty years. Only twenty-seven of the sera protected mice and were, therefore, considered to have come from persons immune to yellow fever. The youngest person with a positive serum was twenty-nine years of age. These results indicate that yellow fever has not been present in this area for many years. The last reported clinical case of yellow fever occurred in Mexico in 1923.

The most common diseases seen among the population of the Usumacinta Valley were malaria, hookworm and other intestinal parasites, pinta, tuberculosis, and cutaneous leishmaniasis. The people were generally malnourished and various signs of avitaminosis were frequently observed. The authors give no details of the deficiency diseases encountered.

A classified list of the mosquitoes collected is given. It is of interest that *Anopheles darlingi* was captured in four different localities, as this efficient vector of malaria had not previously been reported in this region. *Hugh H. Smith.*

CHOLERA.

BANERJEE (D. N.). **Concentrated Saline in the Treatment of Cholera (a Preliminary Report).**—*Jl. Indian Med. Assoc.* 1942. Nov. Vol. 12. No. 2. pp. 39–42. With 2 figs.

The author's contention is that hypochloraemia is a much more important factor than loss of fluid in cholera, burns, pyloric obstruction, toxaemia of pregnancy, etc. He administers a highly concentrated solution of salt intravenously and in comparatively small volume. "The effect," he contends, "after administration of concentrated saline appears to be due to drawing in of the interstitial fluid into the circulation which exists in normal condition in a proportion of 3 to 1, *i.e.*, interstitial fluid constituting 15 per cent. of the total body weight, while the blood fluid 5 per cent. of the body weight." Five cholera patients have been treated with encouraging results. It was found that a quantity no greater than 50 cc. of a 20 per cent. salt solution given intravenously rapidly lowered the specific gravity of the blood and was equal in effect to 3 pints of hypertonic saline. In cholera, therefore, there may be more importance attachable to loss of salts than of fluids.

W. F. Harvey.

CHAPMAN (Cicily J.). **The Use of Rabbits for the Detection of Pyrogenic Substances in Solutions for Intravenous Administration.**—*Quarterly Jl. Pharm. & Pharmacol.* 1942. Oct.–Dec. Vol. 15. No. 4. pp. 361–366.

Intravenous injection of some solutions is apt, on occasion, to produce a pyrogenic reaction which is exhibited clinically by fever, chill, nausea, vomiting and leucopenia. This reaction has been shown to be due to some constituent of the water used and it is very important to be able to certify a solution as pyrogen-free. Rabbits have been used as test animals in the present investigation and the two tests were (1) production of a temperature reaction and (2) leucopenia. It was very essential to train the animals to become used to manipulations as well as the tests themselves, for apprehension may of itself produce reaction. All these precautions were taken, as also was the precaution of estimating a "mean resting leucocyte count for seven of the rabbits" before the investigation started. "The smallest fall in the circulating leucocytes which was given by a solution known to be pyrogenic . . . was about 4,000 so that a fall of 4,000 or more in the mean of the counts taken 45 and 90 minutes after injection is considered to be a minimum reactive leucopenia although the drop is usually greater than this." Control solutions of 5 per cent. dextrose did not in any case give rise to a leucopenia. The temperature of the animals used was also well controlled and it was found, especially in the later experiments, that the temperature rise was closely correlated with leucopenia, "although occasionally a high temperature occurred with no leucopenia. A mean temperature rise of 1·34°C. was produced by seventeen solutions which caused leucopenia, while a mean rise of 0·5°C. occurred in fifty experiments in which there was no leucopenia." Thus the conclusion is reached that—with rabbits as test animals—"a marked leucopenia accompanies the fever reaction which occurs on injection of pyrogen-containing solutions. In the absence of this leucopenia . . . the solution is stated to be free from pyrogens."

W. F. Harvey.

AMOEBIASIS AND INTESTINAL PROTOZOAL INFECTIONS.

Beltran (Enrique). Protozoarios intestinales del hombre en la República Mexicana. [**Intestinal Protozoa of Man in the Republic of Mexico.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. June. Vol. 3. No. 2. pp. 161–167. With 1 map. [13 refs.] English summary (6 lines).

A number of investigators, including the author of the paper under review, have published the results of their examinations for intestinal protozoa of groups of the inhabitants in different parts of Mexico. The author considers these various records, which indicate that in certain districts as many as 86 per cent. of the population harbour one or other of the common intestinal protozoa and 40 per cent. *Entamoeba histolytica*. The incidence of *E. gingivalis* infections is also high, as in two groups examined the infection rates were 25 and 34 per cent.

C. M. Wenyon.

Deschiens (R.). Nouvelles données sur la relation existant entre l'enkystement et la conservation du pouvoir pathogène des amibes dysentériques, en culture. [**Further Information on the Relationship of Encystment to the Maintenance of Pathogenicity in the Dysentery Amoebae.**]—*Ann. Inst. Pasteur.* 1941. Dec. Vol. 67. No. 6. pp. 468–470.

In a previous paper [this *Bulletin*, 1938, Vol. 35, p. 584] the author recorded experiments which indicated that the pathogenicity of *Entamoeba histolytica* when cultivated outside the body quickly diminished unless periodic encystment was induced by the addition of starch to the cultures. The pathogenicity was tested by inoculation of measured quantities of culture into the large intestine of cats through a laparotomy opening. It has since been established that the maintenance of pathogenicity is independent of the associated bacteria. In the present paper further experiments are described. From a certain strain of amoebae, the pathogenicity of which was such that 75 to 83 per cent. of inoculated cats contracted amoebic dysentery, a line was maintained under conditions of culture which did not permit of encystment occurring. At the same time the original strain was carried on as before, periodic encystment being induced. After three years of cultivation under these conditions the two strains were tested for pathogenicity. The original strain produced amoebic dysentery or colitis in 80 per cent. of the cats inoculated, while the new line was tested twice. At one test only one of twenty cats became infected, while at the second test all of twenty cats were refractory. It thus seems clear that the pathogenicity of *E. histolytica* is maintained only if encystment is made to take place from time to time. This is perhaps not surprising, as periodic encystment of the amoeba is a feature of its life-history in its natural environment.

C. M. Wenyon.

Rodaniche (Enid C.) & Kirsner (Joseph B.). **The Effect of Sulfonamide Compounds on the Growth of *Endamoeba histolytica* in Culture.**—*Jl. Parasitology.* 1942. Dec. Vol. 28. No. 6. pp. 441–449.

The action of sulphonamide compounds on the growth of *Entamoeba histolytica* was tested by adding crystals of the drugs to the culture

tubes so that the liquid became saturated with them. The compounds tested comprised sulphanilamide, sulphapyridine, sulphathiazole, sulphaguanidine and sulphadiazine. The medium used was a modification of that of Cleveland and Collier, in which the liquid part of the medium was replaced by a mixture of one part of sheep serum and seven parts of Locke's solution without dextrose. The stock cultures grew luxuriantly in this medium. In most cases the addition of the drug, especially sulphanilamide, to the medium inhibited growth, though in some cases growth continued for longer periods than in the controls. In the case of sulphadiazine and some of the other drugs, crystals were ingested by the amoebae, which did not appear to be inconvenienced in any way by their presence. Culture medium containing the drugs allowed of excystation, though in some cases this was delayed. It is clear from the results obtained that the sulphonamide compounds are not encouragingly active against the dysentery amoebae, but, in the opinion of the authors, they merit clinical trial in amoebiasis. *C. M. Wenyon.*

Lincicome (David Richard). **Fluctuation in Numbers of Cysts of *Endamoeba histolytica* and *Endamoeba coli* in the Stools of Rhesus Monkeys.**—*Amer. Jl. Hyg.* 1942. Nov. Vol. 36. No. 3. pp. 321–337. With 3 figs. [29 refs.]

A series of observations was carried out on two rhesus monkeys which were found to be naturally infected with *Entamoeba histolytica* and *Entamoeba coli*. It was first confirmed that on a diet rich in carbohydrates, consisting of 400 grammes of strained whole banana daily, the growth of the amoebae in the intestine was favoured. Observations were made on alternate days, the number of cysts being estimated for the total faecal matter passed during the previous 24 hours. For this purpose the faecal matter was emulsified and the number of cysts, in measured quantities of the emulsion, was counted. In addition, the quantity of moisture in the faeces was estimated by drying and weighing measured samples. It was found that maximal numbers of cysts were eliminated approximately every seven days, the range of the cycle varying from four to ten or even as long as fourteen days. The cycles of the two amoebae were independent of one another but in all cases the cysts of *E. coli* were more numerous than those of *E. histolytica*, hence the chance of finding cysts of the former was always greater than it was for *E. histolytica*. The number of cysts of the two forms bore no relationship to the quantity of moisture in the faecal matter. When the diet was altered by substituting 25 grammes of pure vitamin-free casein for 100 grammes of banana, the number of cysts found was reduced. Season has little, if any, influence on the cyst elimination. *C. M. Wenyon.*

Rees (Charles W.), Bozicevich (John), Reardon (Lucy V.) & Jones (Frances). **A Preliminary Note on the Complement Fixation Test for Amoebiasis with Antigens Prepared from *Endamoeba histolytica* grown with a Single Species of Bacteria.**—*Amer. Jl. Trop. Med.* 1942. Nov. Vol. 22. No. 6. pp. 581–586.

A method of obtaining cultures of *Entamoeba histolytica* in the presence of a single bacterial species only having been devised [this *Bulletin*, 1942, Vol. 39, p. 765], it was decided to prepare antigen of

E. histolytica from such cultures with a view to comparing the results of complement fixation tests with those obtained with antigens prepared from cultures in which numerous and varying species of bacteria are present. It was felt that with a single bacterium the influence of its presence would be more easily estimated. The amoebae were grown in flasks containing 25 cc. of egg base overlaid with 50 cc. of Locke's solution, with 0·1 per cent. of dextrose and maltose, 3 grammes of ground eggshell as buffer, and 120 mgm. of rice flour. The bacterium present was one previously identified as *Leptotrichia buccalis* and now referred to as " organism *t*." In preparation of the antigen the liquid from 20 flasks was centrifuged, the deposit being left in a volume of 50 cc. After further centrifugation a sediment containing amoebae, bacteria and rice starch is obtained. This is washed several times in Locke's solution and the sediment finally taken up in 20 cc. of this solution. These concentrates have been found to contain 600,000 to 4,000,000 amoebae per cc. The suspension is frozen for four hours and then thawed at 10°C. The liquid, cleared of sediment by centrifugation, is the finished antigen ; this is stored at 10°C.

Preliminary tests carried out with the serum of rabbits immunized against *E. histolytica*, " organism *t* " and the components of the culture medium showed that a minimum of the " organism *t* " antigen and no component antigen was present in the *E. histolytica* antigen. Complement fixation tests were then carried out with human sera from cases diagnosed as, or suspected of being, due to *E. histolytica* infections. In the most satisfactory series, from Baltimore, where experience had shown that the statements regarding presence or absence of amoebic infection could be thoroughly relied upon, the complement fixation test agreed with the diagnosis in 34 of 35 cases. In this series there were six positive complement fixation reactions in sera from five cases with positive stools, one of which also had hepatic abscess, and from one case of amoebic hepatic-pulmonary abscess. From the results so far obtained it is concluded that the antigen prepared from *E. histolytica* and organism *t* possesses marked specificity and a high degree of potency. *C. M. Wenyon.*

HERMANN (Harold B.) & BERMAN (Leonard S.). **Penile Ulcer caused by** *Endameba histolytica.*—*Jl. Amer. Med. Assoc.* 1942. Nov. 14. Vol. 120. No. 11. pp. 827–828.

The authors have found only one record of amoebiasis of the penis in the literature [SHIH *et al.*, this *Bulletin*, 1940, Vol. 37, p. 122] ; they now report a second. The patient, a white United States soldier, was a native of Florida, where amoebiasis is endemic. He noticed a white spot, which gradually enlarged to an ulcer one centimetre in diameter, on the undersurface of the glans ; the spot first appeared 7 days after sexual exposure. At that time Ducrey's bacillus was isolated, and later the Wassermann became positive. The lesion would not heal, but spread considerably ; pain was marked, and in an attempt to divert the urinary stream, so as to facilitate healing, suprapubic cystotomy was performed. Biopsy showed non-specific inflammation only, the exudate and the stools were negative for *E. histolytica* until 5 months after admission, when the protozoon was found in the faeces. Treatment with emetine and carbarsone was ineffective, and while these drugs were being administered the ulcer exudate was found to contain " myriads of cystic forms " of *E. histolytica*, which were grown

in culture. Carbarsone was then applied locally as a 0·5 per cent. solution, with the result that the healing process set in and continued uninterruptedly to complete cure.

The penile infection was probably secondary to the intestinal infection and was a result of bad hygienic habits. The authors point out that amoebiasis should be borne in mind in cases of chronic phagedaenic ulceration of the penis. *C. W.*

CAMERON (J. D. S.) & LAWLER (N. A.). **Aspiration, Air Replacement and Radiology in the Diagnosis and Prognosis of Hepatic Abscess.**—*Jl. Roy. Army Med. Corps.* 1943. Jan. Vol. 80. No. 1. pp. 1–4. With 3 figs.

Aspiration in combination with injections of emetine forms an integral part of treatment of amoebic abscess of the liver. Surgical drainage should be reserved for those cases in which mixed infection has occurred. Aspiration, as here described, can be usefully employed in combination with air replacement.

The site of election for aspiration is in the 8th to 10th interspaces in the mid-axillary line. Local bulging is helpful in the choice of site, but is present only when the abscess is large and aspiration has been too long delayed. Localized tenderness is looked for and the discovery of such a point should lead to its choice for puncture. For aspiration a two-way syringe with wide bore needle, 3½ to 4 inches in length, is preferred to Potain's aspirator, though the needle provided with that apparatus proved satisfactory.

Premedication consisted of administration of morphine gr. ¼ and hyoscine gr. 1/100. Thereafter, local anaesthesia proved sufficient by superficial and track infiltration down to the surface of the liver.

Following aspiration of as much pus as could be evacuated, air was forced in until pain was complained of, either in the liver or in the right shoulder. Replacement with air to half the volume of pus evacuated sufficed.

Prior to aspiration the patient should be screened in the erect position. Suggestive findings are: a high right diaphragm; local bulging of the right cupola; rough or blurred outline of the right diaphragm; shadowing of the right costo-phrenic angle, indicating effusion. These signs are not absolutely diagnostic of hepatic abscess, and are more constant in subphrenic abscess, but the latter usually contains gas.

Examination following aspiration and air replacement should be carried out on the day after tapping. Three radiograms should be taken after screening:—in the antero-posterior position, erect; in the lateral position, erect; in the antero-posterior position with the patient lying on his left side. The casette is placed vertically behind the patient and the central ray is directed horizontally through the required area and at right angles to the plane of the film. The three radiograms determine the position, size and shape of the abscess cavity.

The air outlines the upper part of the abscess and by superimposing the films a correct assessment of the complete size and outline can be obtained; an estimate of residual pus is thus easily made.

Examinations should be repeated a fortnight after the aspiration and thereafter at convenient intervals to determine shrinkage of the abscess cavity and absorption of residual pus.

The air is not absorbed for upwards of a month and the need for further aspiration is thus determined, so that air replacement can, if necessary, be again carried out.

This method has been applied to twelve cases of hepatic abscess with favourable results. In all amoebae were absent from the pus and in three only were cysts found in the faeces. *P. Manson-Bahr.*

Beltran (Enrique) & Lopez Portillo (Silvestre). Presencia de tricomonadinos hematofagos, con cinco flagelos, en un caso de disenteria. [**Blood-ingesting Trichomonads in a Case of Dysentery.**] —*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. June. Vol. 3. No. 2. pp. 153–159. [18 refs.] English summary (7 lines).

The case described is that of a man, 52 years of age, a native of Mexico, who developed an uncontrollable dysentery which proved fatal. Bacteriological examinations failed to reveal any cause of the disorder, which is considered to have been due to the presence of a trichomonas which possessed five flagella and was ingesting red blood corpuscles. It was not possible to perform an autopsy, so that other possible causes of the dysenteric condition could not be excluded *C. M. Wenyon.*

Diaz (M. Pujadas). Lambliasis. Su tratamiento. Informes de casos. [**Treatment of Giardia Infections.**]—*Bol. Asoc. Med. Puerto Rico.* 1942. Oct. Vol. 34. No. 10. pp. 368–370.

It is stated that Giardia infections are very common in Porto Rico and that they give rise to a variety of symptoms which are referable to a gastro-enteritis. Three illustrative cases in children from 3½–8 years of age are briefly described. In all of these the infection was eradicated by atebrin treatment. The dose of the drug varied from 0·15 cgm. to 3 cgm. daily for three to five days. *C. M. Wenyon.*

Ferri (L. V.). **Contribution to the Epidemiology of Balantidiosis.**— *Med. Parasit. & Parasitic Dis.* Moscow. 1942. Vol. 11. No. 3. pp. 108–112. [In Russian.]

The author describes an outbreak, in a mental hospital at Tomsk [Siberia], of severe colitis and dysentery. While some of the cases of intestinal disorder were due to bacillary dysentery, in others *Balantidium coli* was incriminated. Examination of the rectal mucus and faeces of the adult patients revealed upwards of 20 cases of balantidiosis, seven of which terminated fatally. [The total number examined is not stated but it can be gathered that they exceeded 130.] It was also established that many of the patients worked on a pig farm attached to the hospital.

Attention was then directed to the children resident in the hospital: among 68 there were six severe cases of balantidial dysentery and five symptomless carriers.

In view of the fact that all the cases in children occurred in the same ward and taking into consideration the unhygienic habits of mental patients, who often indulge in coprophagy, the author believes that the infection in the hospital was transmitted mainly from man to man. And since cysts were absent from human faeces, it is suggested that

transmission takes place in the active ciliate stage. In support of this view, it is pointed out that the survival of the ciliates in the stomach is facilitated by achylia, a condition commonly observed in patients suffering from balantidiosis.

In conclusion, attention is drawn to the danger of dissemination of balantidiosis in closed institutions. To obviate this risk the following precautions are recommended: (1) faecal examination of all newly admitted patients and of those inmates who are suffering from colitis; (2) prevention of contact between the patients and pigs; and (3) avoidance of pig manure in vegetable gardens cultivated by the inmates. *C. A. Hoare.*

BELTRAN (Enrique). Incidencia de *Balantidium coli* en Tabasco, Hex. [**Incidence of** *Balantidium coli* **in Tabasco.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. Dec. Vol. 3. No. 4. pp. 319–321. English summary (8 lines).

In a previous paper, the author reported 23 cases of human balantidiosis known in the Republic of Mexico; they were gathered from a careful perusal of the available literature, as well as from personal communications of several laboratory workers. After that paper, PIZA BUENO and GRANIER, of Tabasco, had found 36 new cases, some of them personally checked at the author's laboratory. The total number of *Balantidium coli* infections in man, reported up to date in the country, reaches 59.

RELAPSING FEVER AND OTHER SPIROCHAETOSES.

CLASTRIER (J.). Étude expérimentale de deux souches de *Spirochaeta hispanicum* isolées en Algérie. [**An Experimental Study of Two Strains of** *Spirochaeta hispanica* **isolated in Algeria.**]—*Arch. Inst. Pasteur d'Algérie.* 1941. June. Vol. 19. No. 2. pp. 228–239. With 3 figs.

The author gives clinical details of three cases of Spanish-North-African relapsing fever occurring in Algeria during 1938, from two of which strains of spirochaetes were isolated by inoculation of the patient's blood into guineapigs. Numerous larvae and nymphs of *Ornithodorus erraticus* were found in the neighbourhood of the house occupied by one of the patients, but these produced no infection in guineapigs or rats, and all attempts to determine the source of the infection were negative. The two strains, referred to respectively as "Tefeschoum" and "El Kettar," after the villages from which the patients came, were studied in the laboratory animals and found to belong to the species *Spirochaeta hispanica*. Cross immunity tests showed that the two strains differed slightly in their immunity reactions but belonged to the same group. The strain produced latent infections in the brains of infected rodents, which persisted in one rat for 420 days after the spirochaetes had disappeared from the blood.

E. Hindle.

SAUTET (Jacques). Étude d'un spirochète du groupe *Sp. hispanicum* de Buen, 1926, agent causal de la fièvre récurrente libano-syrienne. [**The Study of a Spirochaete belonging to the Group** *Sp. hispanica* **de Buen, 1926, the Causal Agent of Lebano-Syrian Relapsing Fever.**]—*Arch. Inst. Pasteur d'Algérie.* 1941. June. Vol. 19. No. 2. pp. 240–247. With 1 chart. [18 refs.]

The author mentions [*Soc. Méd. Marseille*, 27th November, 1940] that he had effected the transmission of the strain of relapsing fever occurring in Syria and the Lebanons by means of the bite of all stages of *Ornithodorus tholozani*, and now gives an account of the principal characters of the spirochaete leading to its determination as *S. hispanica*.

The strain was obtained from infected Ornithodorus found in a cave near Damascus, where various French soldiers had become infected.

The type of relapsing fever produced is very severe, lasting for about 5 months, with 4 to 6 febrile attacks accompanied by meningitic symptoms in all the five patients under observation. In guineapigs the infection varied in its intensity, producing a mortality of 10 to 30 per cent. After the spirochaetes disappeared from the blood they persisted in the brain for at least 76 days. Rats and mice were also susceptible but the infections were much less severe than in guineapigs.

From its general characteristics, including the results of cross immunity reactions, the author considers that this spirochaete belongs to the large Spanish-Asiatic group, and calls attention to the fact that the distribution of this group of spirochaetes corresponds with that of the Arab-Mohammedan conquest. This supports the hypothesis that *S. hispanica* is of Asiatic origin, and was carried to North Africa and Spain during those campaigns. *E. Hindle.*

HAMILTON (J. B.). **Ocular Complications in Relapsing Fever.**—*Brit. Jl. Ophthalm.* 1943. Feb. Vol. 27. No. 2. pp. 68–80. [10 refs.]

Some interesting observations on the occurrence of ocular complications in relapsing fever in the Middle East have been recorded by Hamilton. MACKENZIE, during an epidemic of the disease which occurred a century ago, noted iritis and "amaurosis" as common complications. In an Australian General Hospital, Hamilton saw twenty-eight cases of relapsing fever from the Western Desert, of whom four developed uveitis, and sixty-three cases from Syria, none of whom had eye trouble. The ocular complications met with were acute iridocyclitis and chronic cyclitis associated with persistent headache. Gross vitreous exudate was a marked feature in both forms. The headache is attributed to an encephalitis. Sufferers from iridocyclitis developed massive posterior synechiae which were readily broken down by mydriatics. Despite the cyclitis and vitreous changes no choroiditis was observed and the prognosis as regards vision is stated to be remarkably good. In all the cases the eye complications were unilateral, though this may not be a universal experience. An important point is that these complications are delayed and the cause may therefore sometimes escape recognition.

Other complications were facial paralysis, herpes febrilis and encephalitis ; in some cases the facial paralysis appeared to be permanent. The author suggests that the Syrian fever is tick-borne and the Western

Desert fever is louse-borne and that this may explain the greater liability of the latter to cause ocular complications. He estimates that 20 per cent. of Western Desert cases may be expected to develop uveitis. *H. Kirkpatrick.*

VAN RIEL (J.). La leptospirose en Afrique. [**Leptospirosis in Africa.**] —*Rec. Travaux Sci. Méd. Congo Belge.* Léopoldville. 1942. Jan. No. 1. pp. 7–22. [64 refs.]

The author gives a useful summary of the occurrence of leptospiral infections in Africa, which have been recorded from various parts of north and tropical Africa, but never in the south of the continent. A special section is devoted to the Central African focus of the disease, the existence of which was established by the author in the region of Lake Kivu [see *Bulletin of Hygiene,* 1940, Vol. 15, p. 174]. Six strains of Leptospira were isolated and tested against known strains obtained from the Prince Leopold Institute of Tropical Medicine, Antwerp. They were found to belong to four groups, *viz., L. canicola*; typical *L. icterohaemorrhagiae* (Weil's Disease); a strain serologically distinct, but related to the latter; and, finally, an entirely distinct strain. All these strains showed considerable variation in their pathogenicity, but clinically the most striking feature was the frequency of meningitic symptoms. There is presumptive evidence in favour of the dog being one of the reservoirs of virus in the Kivu region. With regard to rodents the examination of 104 domestic rats, *Mastomys coucha*, and 162 wild rodents belonging to eight species, gave uniformly negative results.

The diagnosis of the disease must depend on critical serological tests, for many cases are benign, show no signs of jaundice, and are difficult to distinguish from various other local diseases, such as yellow fever, relapsing fever, dengue, etc. Attempts to isolate strains of the virus in guineapigs may not succeed owing to the feeble pathogenicity of the organism. *E. Hindle.*

LEPROSY.

MUIR (E.). **Report on Leprosy in Jamaica.**—*Leprosy Review.* 1943. Jan. Vol. 14. No. 1. pp. 4–17. With 2 maps.

This is a report on a visit made at the request of the Medical Adviser to the Comptroller for Development and Welfare in the West Indies. The Leper Asylum at Spanish Town is of the old prison-like type with little land; it is overcrowded and there is no segregation of lepromatous from early neural cases. The only modern feature in the institution is the provision of six members of a religious sisterhood two years ago at Muir's suggestion. All the 172 inmates had been compulsorily isolated and they included 105 lepromatous and mixed cases, 38 neural, and 29 with disease arrested. The latter might be released, to live near their relations with some financial assistance, with advantage. Inquiries into the history of infection showed that some had contracted the disease abroad. A spot map shows that in rural areas leprosy is a focal disease. The unrevised leprosy law of 1896 requires amendment as some of the provisions are at variance with the Public Health Law

of 1942. Recommendations for the introduction of more modern methods of leprosy control are made. *L. Rogers.*

i. Muir (E.). **Report on Leprosy in Barbados.**—*Leprosy Review.* 1943. Jan. Vol. 14. No. 1. pp. 18–24.
ii. ——. **Report on Leprosy in St. Lucia.**—*Ibid.* pp. 25–29.
iii. ——. **Report on Leprosy in St. Kitts and Nevis.**—*Ibid.* pp. 29–33.
iv. ——. **Report on Leprosy in Antigua.**—*Ibid.* pp. 33–39.

Muir's report on his inquiries in the smaller West Indian Islands can be dealt with more briefly, for his recommendations are similar to those for Trinidad and Jamaica and only the epidemiological data need therefore be mentioned.

i. In Barbados at the end of 1941, 56 cases were accommodated in a fenced-in lazaretto with a site of 32½ acres. The numbers have steadily fallen from 173 in 1924 and the admissions from an average of 6·7 in the first seven years to 3·6 in the last five. Discharges have also fallen to one-third of the former rate owing to the favourable cases recovering early, and leaving mostly irrecoverable cases, which produce a depressing atmosphere. Muir does not find any definite evidence of an actual decrease of the disease, for voluntary early admissions for treatment are very rare, the disease is easily hidden and only begging lepers and those plying certain trades can be compulsorily isolated. Moreover the local doctors are unanimous that there are a great many leprosy cases at large and that the present control system is quite inadequate. Muir advises the introduction of modern methods, including a survey and arrangements for treating early cases apart from incurable ones. His data of the incidence in different parishes are of local interest only.

ii. In St. Lucia the majority of the known cases of leprosy are segregated in a home close to the poor house. The wards are dark and gloomy and hold 29 cases. It was found that six had resided in Guiana and 12 more had indirect contact with that highly leprous country through relatives. Instances of contact infection are quoted. Many of the infectious severe cases had been potential spreaders of infection for months and years before their discovery and internment. Leprosy should be borne in mind during the examination of school-children.

iii. In St. Kitts and Nevis 48 lepers were isolated in a leper home, 38 of whom were still in an active stage of the disease; 24 were in stage L3. In addition 21 are allowed to live at home, six being arrested cases residing near the home. There are probably many undiscovered neural cases in the islands, but only one was detected during the examination of six schools. The head of the leper home should receive special training at the Trinidad settlement. The leper ordinance should be relaxed to allow early cases to be treated as out-patients.

iv. Antigua has 38 cases in a home, of which 20 are not infectious. Many others are allowed to reside in their own homes. A survey is required. *L. Rogers.*

Muir (Ernest). **Leprosy Control in Trinidad.**—*Caribbean Med. Jl.* 1942. Vol. 4. No. 3. pp. 83–91.

This is a report on surveys of leprosy distribution in Trinidad and Tobago with recommendations for its control. No previous survey

had been made, and although it is not yet complete it is estimated that there are about 1,000 cases in the islands, nearly all the new cases originating in Trinidad itself. Hitherto for the most part only advanced cases have been recognized and isolated in the Chacachacare Island settlement, and there has been no out-patient system of treatment for early uninfective cases, which are commonly overlooked. This should be supplied, and surveys made of the children in all the schools, for in the course of examining those of 178 schools Muir detected 25 cases among East Indians and 58 in Africans in spite of the absence of a number of the children. Moreover, other contact cases were often found by following up the cases found in the schools; these were as many as five in the case of one girl and eight contacts of a boy. The education of the medical officers in the detection of early cases and of the public regarding the nature of the disease, its curability at out-patient clinics without isolation in the early stages, and its epidemiology, are of great importance. A leprosy board of experts should be appointed to keep a confidential list of the infected and to coordinate the campaign so essential to success in control of the disease. The Leper Ordinance of 1915 is out of date and should be amended in accordance with present knowledge. *L. Rogers.*

LARA (M. B.). **Rare Bacterial Endocarditis observed among Culion Lepers.**—*Jl. Philippine Med. Assoc.* 1940. Feb. Vol. 20. No. 2. pp. 69–74. With 9 figs. on 4 plates.

This is a well illustrated account of a rare complication of leprosy. In 1927, SOLIS [this *Bulletin*, 1927, Vol. 24, p. 922] described a Gram-negative diplococco-bacillus he had regularly cultivated from the blood of certain septicaemic cases. The present author also cultivated it from the blood of five out of ten lepers who had endocarditis of three to four weeks' duration, and in whom large soft vegetations, containing large numbers of the organism, were found after death, usually on the upper surface of the mitral valve a little way from the margin, but sometimes on the tricuspid or the aortic valves. Septic emboli are also found in the spleen and sometimes also in the liver and kidneys. The identity of the organism is still unsettled, but it is aerobic, grows readily on agar after slight initial refractoriness, and is found in the affected valves abundantly in chains of five to ten non-capsulated, non-spore-bearing pairs. The disease runs a more acute course than *Streptococcus viridans* infections, and it is not considered to be related to the organism of leprosy itself. Its mode of entry into the system is unknown as it may occur in patients without ulceration of the skin. The disease begins as a simple influenza-like fever, followed after about a week by septic symptoms and positive blood cultures, together with enlargement of the spleen due to emboli. There are albumin and casts in the urine, weakness of the heart and puffiness of the face with oedema of the legs. The disease is inevitably fatal. No medicinal treatment tried, including prontosil intravenously, had any effect in retarding the progress of the disease, which does not appear to have been reported among leprosy patients except at Culion. The plates give good naked eye and microscopical appearances of the infected valves. *L. Rogers.*

McCoy (G. W.). **Chaulmoogra Oil in the Treatment of Leprosy.**—*Public Health Rep.* 1942. Nov. 13. Vol. 57. No. 46. pp. 1727–1733. [13 refs.]

In this short note, the author quotes Lara (1930), Hansen and Looft (1895), and Wayson (1929) in Hawaii in support of his belief that chaulmoogra preparations have not been definitely proved to be of value in leprosy. Lara, however, stated that it is of value in suitable cases, but may do harm in others [and the Norwegian authorities only use the old oral method of administration]. *L. Rogers.*

Manalang (J.). **Fate of Culion Patients presented to the Local Negative Examining Committee from 1922 to 1938.**—*Jl. Philippine Med. Assoc.* 1940. Apr. Vol. 20. No. 4. pp. 193–202.

This paper gives important information on the Philippines releases of leprosy patients who have become negative bacteriologically, and on their subsequent condition. They include cases both at the Culion leper settlement and at the provincial centres. The author first describes the psychological condition of the patients after first being found negative and during the repeated bacteriological examinations in the period (up to two years) during which continued negative reports must be received before their release is permitted. Previous recorded data on more limited periods are quoted, in the last three of which the relapses and readmissions varied between 9·8 and 6·2 per cent. The data show that from 1922 to December 31st, 1938, 4,627 patients were under observation by the Local Negative Examining Committee, or approximately 17 per cent. of the total admissions to Culion. Of these 2,457, or 53·1 per cent., were discharged or released under parole as negative and 28 more, or 0·6 per cent., had been transferred or had escaped observation. Deaths numbered 513, or 11·1 per cent., and the remaining 1,626, or 35·2 per cent., are still under the observation of the Committee. The length of time the released patients remained under the observation of the Committee before their release is shown in a second table, the percentages of the 2,457 cases respectively being : six months to two years 67·5, two to five years 26·9, five to ten years 5·5, and more than ten years only 4 cases, or 0·1 per cent. Of the 513 who died during the period of observation, 318 were still positive and 195 negative. Further, 73 patients died after readmission under observation of the Committee, of whom 40 were positive and 27 negative during observation, 4 positive cases became negative and in the remaining two the condition was reversed. Lastly, the bacteriological condition of the 1,266 patients still remaining under the Committee showed that of 1,017 advanced cases 256 were readmitted positive and 1 negative, and of the remaining 575 accounted for, 32 were readmitted positive and 71 negative. Considering the advanced condition of so many of the Culion cases, these results are encouraging. *L. Rogers.*

HELMINTHIASIS.

MARILL (François-Georges), ALCAY (Louis) & MUSSO (Jean-Claude). Contribution à l'étude épidémiologique des foyers marocains de bilharziose urinaire du Tafilalet, du Draa et du Sous. Leur importance comme source de diffusion de la schistosomiase. [**A Contribution to the Epidemiological Study of the Moroccan Foci of Urinary Schistosomiasis in the Regions of Tafilalet and the Oueds (Rivers) Draa and Sous. Their Importance as a Source of Diffusion of Schistosomiasis.**]—*Bull. Inst. Hyg. Maroc.* 1940. Vol. 10. pp. 5–16. [25 refs.]

In 1939 the authors studied schistosomiasis at Saint Aimé-de-la-Djidiouia in the Oran Department of Algeria, to which nomad gangs of agricultural workers come from the Saharan side of the Great Atlas Range. There men return as often as they can to their native villages, where the snail intermediate hosts of schistosomiasis are abundant. They are a menace to the whole of Algeria, probably they are responsible for the Gharb focus in Northern Morocco. Outside Morocco they have now probably contaminated an area previously uninfested, namely, the Bas-Chélif plain with its system of irrigation canals fed by the River Chélif. Some authorities think that Senegalese troops quartered at Orléansville have contaminated these canals, but the authors favour the other hypothesis that they have been contaminated by Moroccan workers using the canals for bathing, etc. Examination of these nomad workers done by the authors suggests that the Saharan side of the Great Atlas range is a vast focus of urinary schistosomiasis. The spread of the infection is favoured by the water system in use there and by the migrations of workers, which are helped by the good transport and means of communication. The danger seems the greater because the examinations carried out by the authors were not done systematically by concentration or centrifugation methods, the inference being that these methods would reveal an incidence still higher than that actually found. Even by their methods they found that, out of 119 of these nomad workers in various centres, 35 were passing eggs of *Schistosoma haematobium* and 23 showed blood in the urine by microscopical examination. Yet all these men, except one, claimed to be in good health. In some areas the percentage of infested workers was high, *e.g.*, in Goulmima and Tinejdad. The authors could not prove that the workers examined had been infested at their native villages, but this is the most likely hypothesis.

Discussing preventive measures, the authors say that the problem of protecting Morocco will be difficult, because it is not easy to alter the migrations of these workers, which are traditional and dictated by necessity. For the protection of Algeria the most radical and important measure is the closure of the frontier between Algiers and Morocco to the Moroccan workers. But individuals would filter through and the Moroccan people, especially those of the south, whose means of existence is already precarious, would suffer. The labour market of Algeria would also be upset and deprived of the excellent quality of the work done by the nomad Moroccan gangs.

A second possible measure would be reservation of the " franchise " of Moroccan workers to those who came from certain zones only which are free, so far as is known, from schistosomiasis, *e.g.*, the Riff, the Taza region and the Middle Atlas. Such a measure would be

imperfect, because all Morocco has not been examined for schistosomiasis and there is no guarantee that nomad Moroccans from uninfested areas have not become infested elsewhere. A third measure is to allow only those Moroccans known to be free from the disease to enter Algeria. This would require the organization of centres for the examination and treatment of the workers in Moroccan territory. Workers should submit to cystoscopy and examination of the urine both when they leave Morocco and when they return to it [but see Barnéoud & Gaud below]. Such centres should resemble the "hospitals for bilharzia patients" which have done such good service in Egypt, except that they would be placed at the points of transit of the Moroccan immigrants, who would have to pass through them or be sent back from Algeria. Probably some parts of Algeria favour schistosomiasis more than others do. Algerian zones in which the climate resembles that of the Sahara favour the disease, their irrigation canals modifying the biological factors by creating permanent fresh water collections in places which were arid before; in these the intermediate hosts find good conditions for their life and individuals passing eggs are the only other factor required. This factor was supplied at Saint-Aimé-de-la-Djidiouia when the Moroccan workers came to that region.

Especially to be feared is the arrival of infested persons in the irrigated Algerian plains. All Moroccan workers should be forbidden to stay in these areas, *e.g.*, the plains of Bas-Chélif, Relizane and Perrégaux. Their entry into other areas served by water barrage systems in Algeria may have to be prohibited.

Malacological investigations of systems of canals like these may not reveal the intermediate hosts until some years after these have become established. At Saint Aimé the authors could not find the intermediate hosts in the natural waters of the Bas-Chelif plain, but 8 years after the construction of the irrigation canals was begun, they found the snails on the stonework of the canals. Combinations of all these suggested measures would increase their efficacy. The real problem is the protection of North Africa and its solution depends on the co-ordination of medical men and the governments concerned.

G. Lapage.

Alcay (L.), Marill (F. G.) & Musso (J. C.). Le foyer de bilharziose urinaire de Saint-Aimé-de-la-Djidiouia (département d'Oran–Algérie). [**The Focus of Urinary Bilharziasis at Saint-Aimé-de-la-Djidiouia (Department of Oran, Algeria).**]—*Arch. Inst. Pasteur d'Algérie.* 1942. Mar. Vol. 20. No. 1. pp. 39–99. With 19 figs. on 8 plates & 5 text figs. [Refs. in footnotes.]

This long and detailed study of the Saint-Aimé focus amplifies the authors' earlier paper (above). It gives details of the incidence of bilharzia in the European and native population in this area and of the occurrence and distribution of the snails and ends with suggestions for prophylaxis and treatment. The physical characters of the rivers and streams and of the irrigation system are described in detail with sketch maps and good photographs.

Examination of the natives showed the importance of this focus, which is at present restricted to the Saint-Aimé area, but is showing a tendency to spread by means of the constant interchange of people among the villages. Its origin is recent, the first cases of haematuria

having been noted in 1935, a year after the irrigation system began to operate in the district. The creation of this system has provided an immense habitat favourable to the snail intermediate hosts. The snails found are listed as *Bulinus contortus, B. contortus raymondi, B. contortus brochii, B. contortus truncatus* and intermediate forms between *contortus* and *contortus brochii* and between *contortus* and *contortus raymondi*; these were the most numerous snails. *Physa acuta* and a species doubtfully diagnosed as *Hydrobia brondeli*, were also very numerous, but *Physa acuta* var. *subopaca*, was rare. Of the species of Bulinus 57 were examined, but none of these was infested with cercariae; these 57 were, however, taken too far away from the centre of the focus and the authors think that more snails should be examined before conclusions are drawn about the degree of their infestation. They give detailed reports of their malacological studies and of their physical examinations of the waterways and suggest that only the River Chélif itself provides conditions suitable for the snails and that this river can be only a temporary habitat for them. In the other streams and natural waters of the Bas-Chélif plain they found practically no intermediate hosts, so that these natural waters need not be feared as sources of the disease. Attention can be concentrated on the irrigation system.

The eggs of Schistosoma come chiefly, in the authors' opinion, from the Moroccan workers from the infested areas of the Sahara south of the Great Atlas range (see preceding abstract). Out of 119 of these workers examined, 48·7 per cent. were infested. The Senegalese troops at Orléansville may be an additional source of eggs. Out of 115 of these examined 11 were passing eggs and 29 had microscopic haematuria; cystoscopic examination showed that 80 per cent. of them had vesical bilharzial lesions, which were often very extensive. Almost all the urine from their barracks eventually finds its way into the River Chélif. The authors examined the sanitary arrangements at the barracks and concluded that it is not impossible, but difficult, for miracidia to survive long enough to infest snails 90 km. away in the canals of the Saint-Aimé region which are fed by the River Chélif. The urine of the townspeople of Orléansville also reaches the Chélif.

The destruction of snails in the canals, which are their main habitat, should be easy, because the canals can be emptied and refilled in a maximum time of 48 hours and can then be cleaned. This was done twice in July 1939. Much cleaning was again done in 1940 and early in 1941 and after it snails were rare. Recently the barrage has been heightened and the rate of the current in the canals has been increased; these and other measures have improved irrigation and have helped to destroy the snails. A better plan would be to carry out special cleaning in May–July when the snails are reproducing and to treat the matter removed with copper sulphate. The whole contents of the canals should be treated with 1 : 500,000 copper sulphate; or ammonium sulphate, which kills the snails and is also a good manure, could be used. But results of these measures will be only temporary unless the centre from which the snails come is found and destroyed.

Regarding the Senegalese soldiers the authors quote the recommendations of Raynaud [*Bull. San. d'Algérie*, 1939, Vol. 34, p. 291] that the theoretically perfect but impossible solution is to send to Algeria only Senegalese who are found by cystoscopic examination to be free from the disease before they leave Dakar. Other measures are insistence on the importance of bilharzia, restriction of immigration into Algeria

to people from non-infested or feebly infested areas, recall of Senegalese garrisons stationed in towns on the coast, construction of sanitary facilities in the barracks which do not foul the waterways, prevention of fouling of the waterways when the soldiers are guarding or working on them, and the systematic treatment of the Senegalese and repatriation of severely infested individuals. Raynaud recommends strict measures for the Moroccan workers. Workers from the southern side of the Great Atlas should be forbidden to stay within the perimeter of the irrigated areas; those from the Riff and frontier areas could be exempted, because they are, so far, free from the disease. Among other measures recommended by the authors are prohibition of bathing in the canals, strict rules for the irrigation workers, who should be given rubber boots and gloves, and propaganda about the disease. Carrosse recalls Mahomet's injunction to Mohammedans not to foul stagnant water with urine nor to wash in water thus fouled. Advantage could be taken of this religious injunction. *G. Lapage.*

Barnéoud (J.) & Gaud (J.). La bilharziose vésicale dans le territoire du Tafilalet. [**Vesical Schistosomiasis in the Tafilalet Territory.**]—*Bull. Inst. Hyg. Maroc.* 1940. Vol. 10. pp. 17–29. With 3 figs. [Bibliography.]

The authors have verified the statement of Marrill, Alcay and Musso (above) that the palm groves of the Tafilalet region are infested with bilharzia. This region is isolated from Atlantic influences by mountains to the west and its climate is Saharan. It is traversed from north to south by the Oueds (rivers) Guir, Ziz and Gheris, which are its only agricultural water supply. Periodically they are in spate or receive water from subterranean streams and this water is led off to the palm groves by a network of canals. Such a water system favours the snails and human contamination by cercariae.

In this area 1,319 people were examined, but the percentage of infested people was based on only 1,126, all Mohammedan boys aged 7–15 years. Indexes of infestation, however, which are based only on the examination of children and adolescents, are higher than those based on the whole population, adults being less often infested than children, girls than boys and Jews than Mohammedans. The authors' figures confirm the views of Marill *et al.* The highest figures were obtained in the regions of the Oueds Gheris and Ferkla, *e.g.*, 74 per cent. at Tourong and 80 per cent. at Igli. The maximum figure obtained at Igli is related to abundant water from irrigation works there, as at Saint-Aimé-de-la-Djidiouia in Algeria. At Tinejdad, where the minimum figures were obtained, water is scarce.

In the valley of the Oued Ziz their figures were 5 egg carriers out of 164 children at Kasr-es-Souq and 32 out of 107 children at Erfoud. Infestations were low along the upper part of the Ziz at altitudes above 1,000 metres. The highest infestation was at Aoufous in its middle reaches and infestation decreased from this along its lower reaches, where water was less abundant. At Abou Denib on the Oued Guir their figures were 18·5 per cent. among Mohammedan children and 2·85 per cent. among young Jews. Their studies of the snails were done in April, when conditions were less favourable for such a study. Intermediate hosts were found in only 2 places, *viz.*, *Bulinus contortus raymondi* abundant at Goulmima (R. Gheris region)

and *B. contortus* very rare at Tinejdad (R. Ferkla region) [*cf.* the low infestation figures found at Tinejdad]. Shells of snails can often be found in the mud cleaned out of the waterways and examination of this mud enables the authors to say that Bulinus exists at Meski (R. Ziz), Goulmima (R. Gheris), Tinejdad, Igli, Mellâb, Tourong (R. Ferkla), Bou Denib (R. Guir) and Bou Anane (R. Guir region) ; and that planorbids exist at Ksar-es-Souq and Meski (R. Ziz), Mellâb and Tourong (R. Ferkla) and Bou Denib and Gourama (R. Guir). But neither Bulinus nor planorbids were found at Rich (upper R. Ziz) and Ain Chair (E. of R. Guir). Bulinus seems to prefer the lower courses of the permanent waterways, Melanopsis frequenting the upper reaches. This doubtless explains why few egg carriers were found among children at Meski (on the upper Ziz). Children prefer to bathe in the upper rather than in the lower reaches. The Oued Ziz and the Oued Guir are already known to be foci. The authors do not think that the Oueds Gheris and Ferkla have been recently infested. The natives say that they know the disease, that they have all had it and that it has never killed anyone ; they think it benign and do not consult doctors (*cf.* Marrill, *et al.* above) so that it has to be sought out to be discovered. Colonial troops, especially Senegalese and Egyptian, have been accused of bringing in the disease, but the authors think that it existed in these areas before the establishment of the Protectorate. If it came from the French Sudan, it may have been brought by black labour from there or by the extensive exchanges between Maghreb and the Niger which went on after the Sultans of Morocco conquered, towards the end of the 16th century, the empire of the Berbers of the French Sudan. The authors think that the contamination of the Tafilalet area is long-standing and is only a part of a vast endemic area, running from S.W. to N.E. and including all the palm groves south of the Atlas. This area constitutes an ancient cradle of the disease which has played, and will play, a considerable part in the spread to North Africa. Only part has been surveyed. The authors' study of the Oued Ferkla and Oued Gheris regions fills in the gap between the known foci in the Oued Ziz and Oued Draa regions, but further surveys are needed. The disease has been noted at Marrakesh. It is logical to regard the other foci in Morocco as originating from this southern Atlas area. The Portuguese focus at Algarve has also been regarded as being derived from Morocco. Moroccans probably contaminated Saint Aimé-de-la-Djidiouia (*cf.* Marill *et al.*, above) where conditions favour the disease, but Morocco is not the only source of the infestations. Foci are known in Tunisia, *e.g.*, at Gafsa, the shores of the Schott Djerid, Kairouan, Matmata, Tabarca and Cape Bon ; others are known in the Algerian Sahara. In general, North Africa seems to have been infested from both East and West, Algeria having escaped until recently, although we do not know whether all the palm groves of S. Algeria are free from the disease, because it is easily overlooked. Prophylactic measures are briefly discussed. Too much must not be expected from them in infested areas, except so far as Europeans are concerned. Travelling workers spread the disease ; irrigation works favour it. Regarding the suggestion of Marill *et al.* that incoming Moroccan workers should be examined before they enter Algeria, Barnéoud and Gaud think that they should be examined at their native villages rather than at the Algerian frontier. After three negative urine examinations done at intervals, they could be given sanitary passports and allowed to proceed. *G. Lapage.*

CLASTRIER (J.). Prophylaxie de la bilharziose. Sur la résistance des bullins à la dessication. [**Prophylaxis of Bilharziasis. On the Resistance of Bulinus to Dessication.**]—*Arch. Inst. Pasteur d'Algérie.* 1941. Mar. Vol. 19. No. 1. pp. 64–66.

The author records the despatch by BARLOW, in May 1940, of 100 dried *Bulinus truncatus* and 40 *Physa subopaca* collected in Egypt on April 23, 1940, to SERGENT at the Pasteur Institute, Algiers. When these were put in water at Algiers 39 days later 17 of the Bulinus shells were damaged and the snails were dead ; but three of the remaining undamaged ones were still alive. One of these, a small one, died the next day ; one, a medium-sized one, lived about a month ; one, a large one, laid eggs a month later and its progeny did well until, two months later, chlorinated town water was accidentally added to the culture and this killed them.

This observation supports BARLOW's contention that Bulinus withstands drying for much longer than used to be thought possible [this *Bulletin*, 1933, Vol. 30, p. 674]. BARLOW found that in Egypt this snail withstood winter drying of the canals for as long as 50 days and that some withstood drying for 7 months in the Kordofan, Egypt, region. These observations are interesting in relation to the study of the focus of bilharziasis in the Bas-Chélif plain in Algeria.

G. Lapage.

CULBERTSON (James T.) & ROSE (Harry M.). **Skin Tests in Schistosomiasis with Antigen from** *Pneumoneces medioplexus.*—*Amer. Jl. Hyg.* 1942. Nov. Vol. 36. No. 3. pp. 311–315. With 3 figs.

The diagnosis of schistosomiasis is difficult if there are few or no eggs in the faeces or urine, and examination of these is useless if the worms are all males. Precipitin, complement fixation and intradermal tests have all been used as aids to diagnosis, but it is difficult to obtain antigens. The antigen generally used is obtained from the livers of snails infected with the cercariae or sporocysts. Infected snails are not available in the United States. However, as FAIRLEY has shown, any mammalian schistosome can be used as a source of antigen for diagnosing infections with human schistosomes, because common antigens exist. Authors are quoted who have used antigens derived from *Fasciola hepatica* of sheep and *F. gigantica* of cattle for the diagnosis of human schistosomiasis. Culbertson and Rose used antigen derived from *Pneumoneces medioplexus*, a distome in the lung of the leopard frog (*Rana pipiens*) and obtained powerful immediate skin reactions in three infected human patients and none in twelve normal persons tested.

The lungs of the freshly-killed leopard frogs were teased and the flukes were washed several times in distilled water and dried in air at 37°C. The dried flukes were triturated in a mortar and a 1 per cent. suspension of this worm powder in 0·5 per cent. " carbolised salt solution " was made. This was incubated for 24 hours and centrifuged. The slightly opalescent supernatant fluid, decanted and tested for sterility, was the stock extract used for the tests with or without dilution with carbolized salt solution. [The positive results with a carbolized extract are interesting in view of the opinion that false positives obtained with Trichinella antigens may be due to the presence of phenol in the extracts used. See SPAETH below.]

For the skin tests 0·1 cc. of the stock extract, or of dilutions of it, were injected intradermally. Weals with pseudopodia which reached a maximum size in 10 minutes were obtained in three patients known to be infected with Schistosoma. The reactions are illustrated. There was local itching. Some patients showed erythema round the weal, but controls given the carbolized salt solution only also showed this. No extension of the initial bleb and no pseudopodia were seen in 12 persons known not to have been exposed to schistosomiasis. In the positives some reaction followed all degrees of dilution of the antigen up to 1 in 200, but there was none after a dilution of 1 in 300. Heating the stock extracts to 100°C. did not impair the antigen; after autoclaving them at 120°C. at 15 lb. pressure there was no reaction in one patient, but in two the reactions were about the same as those given by the unheated extract. Suspension of the worm powder in ether, alcohol and distilled water showed that there was no reaction with the alcohol-soluble substances obtained; with the ether-soluble substances one patient was negative, two gave only slight reactions; with the water-soluble substances all gave reactions as good as those given by the original stock extracts. The antigens are thus primarily water-soluble. Tests on four patients who had been treated and no longer showed symptoms, suggested that skin sensitivity is lost within 3 years, but possibly not within 2 years, after successful treatment. Tests done with antigens from heterologous species must be interpreted with caution, although there is little danger of error when the heterologous species is, like Pneumoneces, not infective to man.

G. Lapage.

D'ALLAINES (F.), LAVIER (G.) & GANDRILLE. Une petite épidémie de distomatose hépatique à "Fasciola hepatica." Diagnostiquée rétrospectivement. **[A Small Epidemic of Hepatic Distomiasis due to *Fasciola hepatica*, Diagnosed Retrospectively.]**—*Presse Méd.* 1942. Dec. 5. Vol. 50. No. 52. pp. 738–739. With 1 chart.

Human distomiasis is rarely recognized because the symptoms are not characteristic. The authors diagnosed three cases nine years after they had become infected. All were taken ill when they returned from La Baule. The source of infection could not be fixed with certainty after so many years, but in other cases it is usually wild or cultivated cress contaminated by sheep [*cf.* BERGE *et al.*, this *Bulletin*, 1942, Vol. 39, p. 703].

The cercariae, encysted on the aquatic plants, pass through the wall of the stomach of the patient to the peritoneal cavity and penetrate Glisson's capsule. While this is happening the patient shows signs of hepatitis with eosinophilia, but, without eggs in the faeces, because the parasite is not yet adult. Passing into the biliary canals, the parasite becomes adult in these in about three months. During this period the patient shows more or less acute symptoms, but these have disappeared when eggs appear in the faeces. The clinical signs are then those of biliary obstruction with a progressive and spontaneous decrease of the eosinophilia.

The three patients, all women, showed different clinical signs. In 1933, case 1 began, soon after the patient's return from La Baule, with painful epigastric crises radiating to the right shoulder. Subicterus of the conjunctivae with dark-coloured urine followed with intervals of

remission of the pain. Her appendix was removed, but the pain persisted throughout 1934. Thereafter she had transient spells of headache, urticaria and diarrhoeic crises. In December 1940 new crises arose, with gall bladder pain, icterus and fever, pale-coloured faeces and mahogany-coloured urine. Medical treatment for gall stones with superadded infection was not effective: the patient lost weight and had persistent nausea, persistent pain in the liver region and in the back. In February 1941 there was another acute crisis. Subsequently radiography showed an enlarged gall bladder with calculi; there was slight anaemia, a lymphocytosis of 33 per cent. and an eosinophilia of 9 per cent. Operation revealed dilatation and thickening of the hepatic duct, which was blocked by two living flukes. Medical treatment for distomiasis was given. Carbon tetrachloride was badly tolerated; emetine had to be stopped after the 15th injection because slight paresis of the lower limbs appeared. The blood showed now a progressive increase of the erythrocytes and an eosinophilia of 4–7 per cent.; the general condition was rapidly improving and pain had disappeared. A further course of emetine caused paresis, hypotension and urticaria. In spite of the patient's excellent general condition and the fall of the eosinophil count to 1·5 per cent., eggs of *F. hepatica* were still being found in the faeces.

In September 1933, patient 2 had painful epigastric crises with headache, insomnia and night sweats, a temperature oscillating up to 39·5° C. and an eruption on the thorax and abdomen which was not diagnosed. The liver was enlarged and tender and respiration difficult. The blood showed anaemia with a leucocytosis and an eosinophilia of 19 per cent. No parasites were found in the faeces. Laparotomy revealed numerous, small whitish nodules on the surface of the enlarged liver, resembling miliary abscesses and some perihepatitis. Aspiration of a pleuritic effusion at the right base drew off scanty, sterile, pale yellow fluid. Polyadenitis suggested removal of an inguinal gland, but examination of this excluded Hodgkin's disease. The temperature then fell and the general condition improved. The patient had lost weight, but her symptoms abated and she recovered strength. Only the eosinophilia persisted. From 1934 onwards epigastric crises occurred about 5 or 6 times a year, but lasted only a few hours. By June 1942 the patient was in excellent general health but still had an eosinophilia of 10 per cent. and eggs of *F. hepatica* were found in the faeces. This patient had most parasites of the three; the nodules on the surface of her liver and the perihepatitis are symptoms well known in animals, but have been noted in man in only two other cases; her eosinophilia was moderate (as compared with recorded eosinophilias of 60–75 per cent.).

Patient 3 had similar epigastric crises in November 1933, lasting for some weeks. In 1934 she had outbreaks of urticaria, frequent nausea and pain in the right hypochondrium. Her blood and faeces were not examined until March 1942, when eggs of *F. hepatica* and an eosinophilia of 6 per cent. were found.

The view that man is a bad host for *F. hepatica* is contradicted by the long duration of infections in him. GUIART noted one of at least four years; BURGI reckoned 13½ years in one case between the signs of infection and the discovery of flukes by operation, but he could not say whether reinfection had occurred. In the authors' 3 cases reinfection was not probable. *G. Lapage.*

PODYAPOLSKAYA (V. P.). **On the Diagnosis of Taeniases under Conditions of Mass Work.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1942. Vol. 11. No. 3. pp. 94–99. [In Russian.]

Since the usual coprological methods are inadequate for the detection of taeniases in mass surveys, an attempt has been made to find a method of diagnosis yielding the highest percentage of positive results from a single examination. This work was carried out in 1939–40 in Azerbaidjan (Caucasus).

A comparison was made of the following methods : (1) examination of faeces (Fülleborn's method and smear), (2) scrapings of the perianal region, and (3) questioning of the population. In the case of infections with the beef tapeworm the best results were obtained with the last two methods. Among 638 known infected persons scrapings were positive in 96·4 per cent., while interrogation indicated the presence of proglottides in the stools of 84 per cent.

Similar investigations on the diagnosis of pork tapeworm infection showed that these methods were less effective. However, in view of the paucity of material, the results obtained with this cestode are inconclusive.

The author recommends the introduction of combined interrogation and perianal scrapings as the chief methods for the detection of beef taeniasis in medical establishments, while questioning of the population is regarded as sufficient for mass surveys, provided the infection in persons reporting positive findings is checked by the examination of perianal scrapings. *C. A. Hoare.*

PODYAPOLSKAYA (V. P.) & KAMALOVA (A. G.). **Cutaneous test as a Method of Diagnosis of Taeniasis and Cysticercosis.**—*Med. Parasit. & Parasitic Dis.* Moscow. 1942. Vol. 11. No. 3. pp. 99–105. [In Russian.]

The authors tested the diagnostic value of an allergic skin reaction for taeniasis. The antigens were prepared from the cysticerci of cattle and pigs and were used as follows : (1) bovine—in cases of beef taeniasis in human beings (112 infected and 48 controls) and in cysticercosis of cattle (14 infected and 37 controls) ; (2) porcine—in human cysticercosis (4 infected). The nitrogen content of the antigen used for tests in human beef taeniasis was 0·00002 gm., and in that used in human and animal cysticercosis 0·000008 gm., per working dose (0·2 cc.).

The cutaneous test reacted positively in 74·1 per cent. of human cases when the beef tapeworm was present and in 56·2 per cent. in its absence, as well as in 28·6 per cent. of cases of bovine cysticercosis and in 17·6 per cent. of uninfected animals. The bovine antigen thus proved to be non-specific in cutaneous tests and unsuitable for diagnostic purposes. *C. A. Hoare.*

PIROSKY (Ig.), PIROSKY (R. de) & CASIRAGHI (J. C.). Hipersensibilidad de infestación en la hidatidosis del hombre. [**Hypersensitivity in Human Hydatid Disease.**]—*Rev. Inst. Bacteriológ.* Buenos Aires. 1942. Sept. Vol. 11. No. 1. pp. 94–98. With 2 coloured plates.

Earlier workers have used in various ways the liquid from hydatid cysts of man, oxen or sheep or extracts of the cyst membranes or scoleces, to produce intradermal reactions for the diagnosis of hydatid infections. The authors studied : (A). The nature of the antigens

The reaction can be produced either by a protein or by a polysaccharide, both of which they isolated from the hydatid fluid, the cyst membranes or the scoleces. They obtained the protein by precipitation with saturated NaCl at *p*H 3·2 and redissolved it in normal saline at *p*H 7·8, the process being repeated several times before the final solution was used. The polysaccharide was obtained by treatment of the material with alcohol at *p*H 5 in the presence of sodium acetate (5 per cent.). The optimal dose of the protein produces in an infected and sensitive patient a local reaction which has the three classical features—a central pale red papule, which extends within 4–40 minutes and emits " pseudopodia " which distinguish it from pseudo-reactions ; a zone of erythema round this which begins in 10 minutes and increases to its maximum in 40 minutes ; after 5 hours there is intense and homogeneous erythema 6–10 cm. in diameter with the third characteristic, oedema, now 3–4 cm. thick. The erythema persists for 48 hours and the oedema for 4–5 days. The polysaccharide produces a reaction with the same three features, but the oedema is predominant ; this reaction also begins early and lasts only 3–5 hours and is much less intense. Thus both reactions begin early, but the reaction to the polysaccharide is only transient.

(B). The optimal dose of the antigen. To obtain a maximal intensity of the reactions and to avoid non-specific reactions, the authors used the highest concentration of each antigen which did not cause a reaction in non-infected patients. The doses of the protein and polysaccharide antigens are discussed and good coloured illustrations of the reactions obtained with them are given. Details are included to show that, with the protein antigen, the intensity and duration of the reaction varies with the concentration of the antigen and with the sensitivity of the patient ; with the polysaccharide antigen, the reaction does not last long but its intensity also varies with the concentration of the antigen.

(C). The immunological mechanism involved. To test this the P.K. (Prausnitz-Küstner) reaction was used. Into the upper, middle and lower thirds of one forearm of a non-infected patient 0·1 cc. of serum from an infected patient was injected and into similar sites on the other forearm 0·1 cc. of normal serum. After 24 hours protein antigen was injected into the sites already injected in the upper thirds of the forearms, polysaccharide antigen into the sites on the middle thirds and normal saline into the sites on the lower thirds. Each normal individual was used once only. Nine sera were thus investigated. In 7 of them the reaction was positive to the protein antigen only. One was positive to both antigens. The other was negative to both. The authors conclude that, in spite of the few cases studied, the reaction can be regarded as a true antibody-antigen reaction. *G. Lapage.*

MEESER (C. C. V.). **Preliminary Notes on Simuliidae (Diptera) of Southern Rhodesia.**—*Proc. Rhod. Sci. Assoc.* 1942. Vol. 39. pp. 28–38. With 3 plates. [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. pp. 39–40.]

This paper consists of a list of 16 species of *Simulium* recorded from Southern Rhodesia (all except one having been taken there in 1940 or 1941), with data on their distribution within the colony, and

their breeding places. Brief notes are also given on the life-history of Simuliids in general, methods of collecting, rearing and preserving them, their relation to *Onchocerca volvulus* (which occurs, but has not been studied, in Southern Rhodesia) and their seasonal prevalence. Larvae were first found in considerable numbers at the end of the rains, and from this time onwards, formed big, black masses on rocks, etc.; pupae became numerous at the end of April and were most abundant between May and August. In December 1941, females of *S. elgonensis*, Gibbins, were observed to enter the water to a depth of an inch and deposit eggs on a submerged rock, returning several times to add more eggs to the mass already laid. The process lasted 15–20 mins. Large numbers of *S. bovis*, De Meillon, were found by A Cuthbertson attacking both Europeans and Africans; adults of the other species were not observed to feed.

MAZZOTTI (Luis). Comprobación de la existencia de *Microfilaria ozzardi* en Mexico. [**Verification of the Existence of** *Microfilaria ozzardi* **in Mexico.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. Sept. Vol. 3. No. 3. pp. 223–228. With 4 figs. on 1 plate. English summary (8 lines).

Microfilaria of *Mansonella ozzardi* have already been found in Panama, Colombia, Dutch Guiana, Argentina and the islands of Santa Lucia and Dominica. In Mexico HOFFMANN recognized them in natives from the Quintana Roo region. The author found endemic foci of this filariasis in the northern part of the State of Campeche and in the frontier regions of the Peninsula of Yucatán, in two of which the percentage of parasitized individuals exceeded 50. He gives the measurements of the microfilaria by which he identified it. Surveying its incidence in the Yucatán Peninsula, he found that 300 workers from the Quintana Roo region were all negative; but in the western watershed of the Peninsula the following percentages of infected persons were noted: Santa Cruz, Campeche, 53 per cent. of 109 examined; Santa Maria, Campeche, 78 per cent. of 28; Tancunché, Campeche, 25 per cent. of 32; Hecelchakán, Campeche, 11 per cent. of 73; and Chunchucmil, Yucatán, 1 per cent. of 100. In relation to the population the figures for Santa Maria and Santa Cruz are higher than those given by MCCOY for Darien, Panama (44·5 per cent. of 119 examined).

Out of 618 persons examined in the western watershed 98 were infected, 59 being men and 39 women. No infections were found in children under 3 years. The infected persons were found in an area devoted to the cultivation of agave, which had a climate, topography and vegetation more like that of central Yucatán than the wooded regions of Quintana Roo, from which Hoffmann's two cases came. This watershed is less than 10 metres above sea level; it is a limestone area covered with a thin layer of red soil and humus, with depressions filled with water, which is either permanent or only there in the wet season. *Culicoides furens* is mentioned as a possible vector of *M. ozzardi*. In Santa Cruz it is active all the year round, but becomes a pest in the wet season. Females are easily collected in the open in the shade during the early morning or at sunset; but they attack man most at night inside houses. *G. Lapage.*

Baron (Bessie) & Brunner (Matthew). **Active Sensitization in Human Beings with Trichina Antigen.**—*Jl. Allergy.* 1941–42. July. Vol. 13. No. 5. pp. 459–466.

Brunner has already been able to sensitize a large percentage of human beings to Ascaris antigen by repeated subcutaneous injection of Ascaris extract and to transfer the positive skin reactions to normal people by the Prausnitz-Küstner technique. This paper records a study of the sensitization of patients with Trichinella antigen and of group relations between Trichinella and Ascaris.

Three different antigens were used, all derived from larvae digested out of the muscle of infected rabbits. Antigens 4 and 5 were used undiluted and unstandardized; antigen 9 contained 2·35 mgm. of nitrogen per millilitre and it was used at a dilution of 0·1 mgm. of nitrogen per millilitre. All the antigens were extracted in saline and were free from preservatives. Atopic patients were used, earlier experiments with Ascaris having shown that their atopic nature did not increase their tendency to sensitization. The first intracutaneous test was done with 0·1 ml. of antigen 9 and only patients giving negative reactions were used. Injections of 0·1 ml. were given to these at intervals of 1–2 weeks over a period of 4–20 weeks, skin reactions being read within 15 minutes after testing. When hypersensitiveness developed a positive skin reaction resulted from the intracutaneous test, consisting of erythema and itching within 5 minutes, followed by a weal.

In series 1, six patients aged 12–28 years were given antigen 4. Sensitizing injections of 0·1 ml. of undiluted antigen were given for 4–10 weeks. Cases 1 and 2 gave positive reactions with weals with the 3rd sensitising dose; case 3 gave it with the 5th; cases 4, 5 and 6 were doubtful after 6 injections.

In series 2, six children aged 4–12 years were given antigen 5. Sensitizing injections of 0·1 ml. were given for 6–9 weeks. Case 8 was positive with the 6th sensitizing dose; case 10 with the 7th; case 7 with the 9th; cases 9 and 12 were doubtful with the 4th, one continuing doubtful, the other becoming negative; case 11 remained negative after the 8th dose.

In series 3, six patients aged 14–44 years were given antigen 9. Sensitizing doses of 0·1 ml. were given for 12–20 weeks. Case 18 was positive with the 4th dose; cases 13 and 15 with the 5th; case 14 with the 8th; further tests confirmed all these; case 17 was doubtful to the 9th and 11th doses; case 16 had given no reaction by the 11th dose. Cases 12 and 17 were considered negative because they never gave one-plus weals (weakly positive) and weals did not reappear with subsequent sensitivity doses. Of these 18 cases 10 (56 per cent.) showed induced sensitivity indicated by a weal and erythema. When patients showed definite cutaneous sensitivity blood was taken from them and centrifuged and kept in a refrigerator without preservative. Normal nonatopic persons who gave negative intracutaneous tests were given 0·05 ml. of undiluted serum at several sites on each arm; they were then tested intracutaneously 3–7 days after sensitization, controls being done on the skin adjacent to each sensitized site. Ascaris antigen was used for testing at a dilution of 0·1 mgm. of nitrogen per millilitre and Trichinella antigen undiluted or at dilutions of 1 or 0·1 mgm. of nitrogen per ml. The reactions were read about 20 minutes after testing. Sera were also used from patients sensitive to Ascaris antigen

as a result of being infected with Ascaris. Out of 57 transfer tests on Trichinella sera with Trichinella antigen 13 were negative, 35 were weakly positive, 7 were definitely positive and 2 were strongly positive. Of the 17 transfer tests done with these same sera with Ascaris antigen 7 were negative, 7 were weakly positive, 1 was definitely positive and 2 were strongly positive.

Out of 17 passive transfer tests done with Ascaris antigen on 9 Ascaris sera 1 was negative, 3 were weakly positive, 2 were definitely positive, 8 were strongly positive and 3 were markedly positive. Out of 10 passive transfer tests done on these same sera with Trichinella antigen 8 were negative, 1 was weakly positive and 1 was definitely positive.

These results indicate that Ascaris and Trichinella extracts contain a common antigen and that the homologous antigen gives stronger reactions than the heterologous one.

The authors conclude that skin test doses of Trichinella antigen may sensitize the skins of normal individuals; that definite marked hypersensitization developed in 6 out of 18 patients after 3-5 sensitizing injections, while in 10 out of 18 patients there was definite evidence of sensitivity by the 9th dose; that the cutaneous reaction in sensitivity to *Trichinella spiralis* is mediated by the atopic reagin and can be transferred to normal skins; that Ascaris and Trichinella antigens contain a common antigen, which is probably stronger in the Ascaris than in the Trichinella extract, even though the Trichinella antigen transfers better on Trichinella sera; and that the diagnostic value of Trichinella tests diminishes with repeated intracutaneous injections.

G. Lapage.

Spaeth (Harald). Die Diagnose der Trichinose mittels Hauttest und Komplementbindungsreaktion. [**The Diagnosis of Trichiniasis by means of the Skin Test and the Complement Fixation Reaction.**]—*Deut. Med. Woch.* 1942. Sept. 18. Vol. 68. No. 38. pp. 935-938.

The simple method of the skin test, which can be done at the bedside, is a valuable aid in the diagnosis of doubtful or symptomless cases of trichiniasis; it is more sensitive than the eosinophilia, which may be low or absent; it is useful for the detection of infections among people in areas where the infection is known to have occurred. The complement fixation reaction is not so reliable and is troublesome, requiring a trained staff. This conflicts with Gaase's results (*Muench. Med. Woch.*, 1941, No. 16). Gaase, using antigen made by the same makers (I. G. Farben Werk. Hochst) found the complement fixation reaction to be specific and valuable for diagnosis. [It would appear that much of the confusion of opinion about the respective value of these two tests arises from the use of antigens prepared by different methods, from the reading of the reactions at different times during the progress of the disease and from the use of different dilutions of the antigen.] Spaeth emphasizes the need for a sound antigen; one consignment sent to him was spoiled; he thinks that a dried powder is the best; the antigen in ampoules dissolved in 0·5 per cent. phenol gave, after being kept for 6 months, many non-specific reactions. [Probably the phenol was responsible for this. Bozicevich's (this *Bulletin*, 1939, Vol. 36, p. 847) antigen made with saline only kept for 6 months in the sunlight.]

Spaeth describes the technique of the skin reaction. An antigen dilution of 1 : 500 was used and 145 persons were tested. The immediate reaction appears within 10–30 minutes and consists of a red weal of varying extent, which may develop pseudopodia and usually has an erythematous area around it of variable size. The weal is occasionally white or varies from white to pink. The delayed reaction, when it is typical, shows the cockade form shown by the tuberculin reaction, *i.e.* a dark red raised centre often bordered by a flat white weal 1–5 mm. broad; around this again there may be a broad red erythematous area. This late reaction may be visible after 48 hours to 3 days.

Briefly, the reactions given by the 4 groups of patients are as follows. Group 1 consisted of 38 men, aged 30–45, all already diagnosed. In the 7th week (11 weeks after the eating of infected meat) an immediate reaction occurred in 35 of them; 3 were negative, but 2 of these were positive with an antigen dilution of 1 : 250; the third was not tested again. In the 13th week 30 of these 38 were tested again. Both immediate and late reactions then occurred in 15; the immediate reaction alone occurred in 9, the delayed reaction alone in 5, while one showed neither reaction.

Group 2 consisted of 21 men, aged 19–30. In the first week (4 weeks after the eating of infected meat) 6 showed no immediate reaction (within 30 minutes), in 5 the reactions were slight, while in 10 they were well marked. After 3–6 hours the delayed reaction was marked in all. In the 4th week 12 were tested again and all showed an immediate reaction and also a delayed reaction 6 hours later; after 24 hours this had disappeared from 3. In the 6th week 19 were again tested. In 7 the immediate reaction was then well marked, in 2 it was feeble, in 10 it had been lost (negative); the delayed reaction (at the 14th hour) was positive in 15, negative in 4, *i.e.* in the 6th week some negatives occurred, but only in cases which had earlier been feebly positive. In the 13th week 21 were again tested. The immediate reaction was well marked in 14, feeble in 4 and negative in 3, all of these negatives having been feebly positive or negative in the earlier tests. It was possible to note the delayed reaction after 24 hours in only 10 of these patients. It was positive in 5, feeble in 4 and negative in 1. Almost all of the 20 men of group 3, after the 5th week, gave negative delayed reactions and the reliability of the antigen used was doubted.

The tests done on the 62 men of group 4, who were contacts from the area from which the men of group 1 were drawn, indicated the value of the test for the diagnosis of suspected but undiagnosed cases. At a time corresponding to the 3rd to the 5th week of the disease in the men of group 1, 17 of group 4 gave a positive skin reaction and had an eosinophilia of 10–42 per cent. In 33 of them, who had no eosinophilia or symptoms, the test was negative and these were regarded as free from the disease. Of the remaining 12 one had no eosinophilia and his positive skin test was regarded as doubtful because he had asthma. The test was negative in 3 who had light eosinophilia of 6–10 per cent., but no symptoms; these also were regarded as free from the disease. The test was positive in 6 others, none of whom showed symptoms, eosinophilia being absent or doubtful; these 6 were regarded as being cases of latent trichiniasis (*trichinosis insensibilis* of Wiegand). The remaining 2 of group 4 had eaten uncooked infected meat, but they had a negative skin test without eosinophilia or symptoms and were regarded as having escaped infection. The skin test thus diagnosed

certain symptomless cases, in men who had eaten infected meat, some of which had been cooked. It was also more reliable than the eosinophilia.

For controls on healthy men only a small amount of antigen was available. All the 24 men tested were negative except one who came from an infected area. Infection with other nematodes (Ascaris, Trichuris, Enterobius) are important. The author, taking his facts from a paper by SCHIPULL, does not fully represent the results of MCCOY, MILLER and FRIEDLANDER, who found that group reactions due to infections with Trichuris may occur with an antigen dilution of 1 : 500, although they are less likely with a dilution of 1 : 10,000 ; they did not think that infections with nematodes other than Trichuris were an appreciable factor in causing group reactions to the 1 : 10,000 dilution. They thought that a negative skin test is more valuable than a positive, but still considered the test to be a valuable aid in diagnosis. [Their antigen was preserved in phenol (0·4 per cent.). Bozicevich obtained no false positives in the presence of Ascaris, Trichuris, hookworms, Enterobius and *Hymenolepis nana*, using his antigen made with saline only, *i.e.* without preservatives ; but BARRON & BRUNNER find that Ascaris and Trichinella extracts contain a common antigen.] Spaeth criticizes KILDUFFE's results on the ground that his antigen dilution was too strong and that he read his reactions too late (at 24 and 28 hours) ; Spaeth insists that the time of the investigation after the beginning of the disease must be considered.

Thus the skin test is a valuable diagnostic aid. In all clinically certain cases up to the 7th week both immediate and delayed reactions were positive. After the 7th week in 5 out of 59 patients both reactions were negative, but the antigen was uncertain and 2 of them tested again in the 13th week were positive. After the 6th week the test, in general, decreases till it is feeble in light infections. In the early weeks both immediate and late reactions are usually equally strongly positive ; after the 6th week only one of them may be positive. In the first week of the actual disease the delayed reaction alone may be positive, the immediate negative ; this indicates that the antibody has to be carried to the skin from some other source. The latest test done by Spaeth was at 6 months and it was then still positive.

G. Lapage.

DEFICIENCY DISEASES.

MOORE (D. Fitzgerald). **Food and Vitamin B Deficiencies.**—*Jl. Trop. Med. & Hyg.* 1942. Sept. 1. Vol. 45. No. 17. pp. 129–131. [12 refs.]

The author recalls his original observations (published in 1934 and subsequent years and summarized in this *Bulletin*) upon the interesting syndrome, occurring in native school-children in Southern Nigeria,

characterized by angular stomatitis, sore tongue, dry scaly itching scrotum, associated with dimness of vision, etc., a syndrome subsequently shown to be improved by administration of riboflavin and cured by marmite but unaffected by nicotinic acid. This syndrome was constantly associated with the consumption of a preparation of manihot called *gari* as the staple food. At the author's request Miss CHICK tested samples of manihot and *gari* obtained by him from West Africa, and showed them to have a practically negligible riboflavin content. While reserving his opinion concerning any positive ill effect from the manihot and its preparations and also concerning the question whether any other vitamin than riboflavin is involved, he believes that " dead " foods as he calls them, such as *gari* in Nigeria, and rice, sago, arrowroot in other parts of the world, are a grave nutritional danger when eaten to the exclusion of what he calls " protective " foodstuffs.

In conclusion he says " It is necessary to keep careful observation on the increased use of such foods in the tropics under conditions where the rest of the diet may be lacking in sufficient protective foods." [A very pertinent observation when, now more than ever perhaps, by force of circumstances or mere fashion, native races change their staple foods.] *H. S. Stannus.*

DEKLEINE (William). **Control of Pellagra.**—*Southern Med. Jl.* 1942. Nov. Vol. 35. No. 11. pp. 992–996. With 1 graph. [11 refs.] [Summary appears also in *Bulletin of Hygiene.*]

The highest death rate from pellagra in the United States was recorded in 1928. It was 22·4 per 100,000 for the thirteen Southern States in which pellagra has been a major health problem for many years. This was the peak year of a rapidly increasing mortality rate and from then on it progressively decreased, to reach a rate of 5·1 per 100,000 in 1940. The factors responsible for this improvement are discussed. It is significant that the greatest improvement occurred in the 1929–1932 period, a time of severe depression, and it was due to work of the American Red Cross in distributing yeast extensively and in promoting gardening. The Federal Food Relief programme (started in 1933) did not affect the pellagra death rate, though it no doubt prevented other serious forms of malnutrition. Actually the downward trend continued at a much slower rate from 1933 to 1936, coinciding with a sharp reduction in the amount of yeast distributed and a diminution in the gardening propaganda. The free distribution of food (as under the " New Deal ") does not necessarily alter the dietary habits, for those on relief are able to select largely what they want and not necessarily what they need. Had it not been for the interest of pellagrins themselves, who begged for yeast when they became ill, the death rate would probably have risen again during the 1933–36 period.

Niacin [nicotinic acid] is undoubtedly the best therapeutic agent, but unless treatment is followed by a diet which contains other parts of the vitamin B complex, disturbing symptoms, not directly related to the disease, may arise. It cannot be distributed on a mass basis as its use demands personal medical control, and it seems that brewer's yeast will continue to play an important part in the control of the disease. Advanced cases are now much less common, but milder cases are numerous and the disease will not be eradicated completely until an adequate diet is obtainable by all in the affected areas.

H. N. Green.

MILLAN GUTIERREZ (Jorge), SALAZAR MALLEN (Mario) & MARTINEZ BAEZ (Manuel). Existencia en Mexico de la melanosis de Riehl. [**Melanosis of Riehl in Mexico.**]—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. Dec. Vol. 3. No. 4. pp. 333–346. With 12 figs. on 2 plates. [12 refs.]

For two years past the authors have been observing and studying cases of " dyschromic dermatosis " to which they had called attention previously as occurring particularly in women of the poorest class. The condition is characterized by dark pigmentation of exposed parts—face, neck, arms and hands. The diagnosis of Addison's disease or of pinta has often been made and treatment by suprarenal extract or arsenic given, without benefit.

The authors now class it in group 5 of Gougerot's pigmentary lichenoid conditions, *i.e.*, Invisible pigmentary lichen without pruritus. Of 15 cases here referred to ten were bakers, two were cooks, two engaged on laundry work and one a hawker ; in other words most were exposed to unusual heat and the parts most exposed were those most affected. The lesions may be quite small, punctate and numerous, or the areas involved may be large with ill-defined edges. Biopsy reveals the histology of subacute to chronic inflammation, with melanophore cells. One of the authors has produced the condition experimentally by exposure to heat from a stove or to infra-red rays.

As stated, the subjects were of the poorest class, their diet was inadequate, with little meat and much maize. Without going so far as to state that these are cases of pellagra, they say that the diet is deficient in vitamins, especially the B complex and C. Change of occupation and improvement in diet are followed by restoration to normal.

H. Harold Scott.

SPRUE.

VEDDER (Edward B.). **The Components of the B_2 Complex in the Cohn Liver Extract in Relation to Sprue.**—*Amer. Jl. Trop. Med.* 1942. Nov. Vol. 22. No. 6. pp. 609–612.

In addition to the erythrocyte maturing factor (E.M.F.), the Cohn fraction, which in various stages forms the basis of all commercial liver extracts, also contains a factor which restores the ability of the intestine to absorb fats—an ability which is lost in sprue, and the loss of which is responsible for most of its symptoms.

In order to obtain evidence concerning this latter factor certain experiments were performed on a diet adequate, except for thiamin and the B_2 complex, but with the addition of the Cohn fraction of liver extract, and subsequent addition of synthetic vitamins of the B_2 complex as they were required to ensure growth. Details are given of the preparation of the Cohn fraction from one kilo of beef liver In preliminary experiments it was found that rats fed on this diet, in addition to the Cohn fraction of liver, all developed polyneuritis which was relieved by the administration of thiamin chloride. From this it became apparent that the Cohn fraction contains no thiamin. These rats required pyridoxine (B_6) and pantothenic acid and there was little gain in weight until riboflavin was added.

As the result of the experiment it could be reasonably inferred that, since the Cohn fraction of liver is deficient in thiamin, pyridoxine, pantothenic acid, riboflavin and choline, none of these factors is responsible for the relief of the intestinal symptoms of sprue.

Nicotinic acid was not added, as liver extracts are known to contain this vitamin in relatively large quantities (up to 450 mgm. per cent.).

From this experiment it could not be stated that the action of liver extract on the intestine is due solely to its contained nicotinic acid, but it is highly probable that this is so.

The author considers that the erythrocyte maturing factor (E.M.F.) of the Cohn fraction of liver relieves the macrocytic anaemia of sprue but has no effect in controlling intestinal symptoms, and that the substance in liver that controls intestinal absorption is nicotinic acid.

P. Manson-Bahr.

KAUFMAN (William H.) & SMITH (Dudley C.). **Cutaneous Changes in the Sprue Syndrome.**—*Jl. Amer. Med. Assoc.* 1943. Jan. 16. Vol. 121. No. 3. pp. 168–171. With 3 figs. [21 refs.]

In sprue, glossitis, stomatitis and fissuring at the angles of the mouth (ariboflavinosis) respond favourably to liver extract and appear to be related to deficiency of the vitamin B complex.

The rôle of avitaminosis in the production of pigmentation of the skin required investigation. There can be no doubt that a deficiency of the fat-soluble vitamins exists in patients with steatorrhoea. Certain components of the skin changes in sprue, such as roughness and dryness of the skin with follicular keratosis, may be due to avitaminosis A. It may be that the low values for serum calcium and phosphorus may be due to failure of absorption of vitamin D.

Since the icteric index is rarely elevated, excessive haemolysis appears to play little part in the production of pigment. The skin pigment does not give the iron reaction. The histopathological features of the case described show an increase in the melanin content of the basal cell and rete layers and support the theory that this pigmentation is an increase of the normal skin pigment.

Differential diagnosis of the cutaneous pigmentation of sprue offers no great difficulty.

The pigmentation of Addison's disease may be indistinguishable clinically and histopathologically from that of sprue ; but pigmentation of the mucous membranes of the mouth in this disease may be of differential value, and the tendency to excretion of urine with high chloride concentration is of diagnostic significance. *P. Manson-Bahr.*

VAUX (Dorothy M.). **Chyladenectasis with Steatorrhoea.**—*Jl. Path. & Bact.* 1943. Jan. Vol. 55. No. 1. pp. 93–96. With 3 figs. on 1 plate.

Obstruction of the lacteals has been held responsible for the sprue syndrome. It is claimed that the record of the case here described bears this out. The subject, a man of 49, had suffered from indigestion for 9 years. He had had cholecystectomy and finally partial gastrectomy with gastro-enterostomy done, the last on the supposition that the condition of the stomach was malignant. From this last operation he did not recover, but six weeks prior to death he suffered from diarrhoea with steatorrhoea of moderate degree (39·1 per cent. of dried faeces) with positive occult blood.

At autopsy interest centred round the mesenteric glands, which were swollen, rubbery, discrete, and formed a large mass. The cut surface appeared finely cystic and oily droplets exuded on slight pressure. The lacteals of the jejunum and upper ileum were conspicuous and slightly dilated. In microscopic sections of the affected lymph glands the same appearances were observed. The most striking feature was the dilatation of the lymph sinuses, producing cystic spaces, ranging up to 5 mm. in diameter. Foamy macrophages formed an outer surrounding layer in many of the dilated sinuses.

It is considered that the main features correspond to the case described by HURST, WRIGHT and RYLE (1942) of chronic mesenteric tuberculosis of 17 years' duration with sprue symptoms, as well as the four described by FAIRLEY & MACKIE (1937).

The only similar case to the present one in England was described by GLYNN and ROSENHEIM in 1938.

[It is by no means clear from the published protocol whether this case could be said to have exhibited typical sprue symptoms. There is no mention of glossitis, hypocalcaemia or macrocytic anaemia, whilst steatorrhoea was of moderate degree only.]

P. Manson-Bahr.

HAEMATOLOGY.

TROWELL (H. C.). **The Case for the Recognition of Dimorphic Anaemia as a Common Deficiency Anaemia.**—*East African Med. Jl.* 1942. Dec. Vol. 19. No. 9. pp. 268–274.

Detailed analysis of some 450 cases of anaemia in Africans at Mulago Hospital, Kampala, revealed that at least half represented a mixed nutritional macrocytic anaemia and an iron deficiency anaemia co-existing in the one and the same individual. For this anaemia of dual causation the name dimorphic anaemia is suggested. Stained films show hypochromic cells in the middle of the smear, while in the tail and edges the cells are macrocytic, many are oval and there is much anisocytosis. The colour index tends to be low or high as the deficiency of iron or of the nutritional macrocytic factor respectively predominates, but determinations of the mean corpuscular haemoglobin concentration show many of the macrocytic types to be hypochromic, and the colour index is often balanced about unity. Patients with perhaps only a few malaria parasites or a few hookworm ova, but with a severe anaemia, whose colour index was one, were perplexing until the conception of dimorphic anaemia was established. Treated for the intercurrent infections such patients showed little improvement. Following the administration of iron, however, there was a reticulocytosis and a rapid but incomplete improvement, the colour index became greater than one, there was increased macrocytosis and the hypochromia was changed to orthochromia. Adequate doses of liver then produced a second reticulocytosis and further improvement. The majority of anaemias in the natives were of this type and required, therefore, both iron and extrinsic factor. Liver, which is now condemned because of infection with fluke, but which could never cause infection in man even if eaten raw, might well be used as a cheap source of extrinsic

factor. Finally it appears that malaria and hookworm infections are well tolerated by most natives and seldom cause much anaemia, provided the diet is adequate. [See also this *Bulletin*, 1943, Vol. 40, p. 329.] *F. Murgatroyd.*

VENOMS AND ANTIVENENES.

SERGENT (Etienne). Sérothérapie antiscorpionique. Troisième note. Nouvelles observations (1939). [**Treatment by Scorpion Antivenene.**]—*Arch. Inst. Pasteur d'Algérie.* 1940. June. Vol. 18. No. 2. pp. 248–274.

——. Sérothérapie antiscorpionique (quatrième note). Observations de l'année 1940.—*Ibid.* 1941. June. Vol. 19. No. 2. pp. 290–303.

——. Sérothérapie antiscorpionique (cinquième note). Observations reçues pendant l'année 1941.—*Ibid.* 1942. June. Vol. 20. No. 2. pp. 117–129.

In these three papers the author continues the series of observations on the value of the serum treatment of scorpion sting, accounts of which were given in this *Bulletin*, 1939, Vol. 36, p. 864 ; 1940, Vol. 37, p. 519. Between 1936 and 1941 the number of cases treated was 873, of which 218 were grave and presented symptoms similar to those noted in fatal cases. Serum was normally injected subcutaneously, in doses from 10 to 60 cc. (usually 20 cc.), and in 184 so treated there occurred 22 deaths. In a few cases serum was given intramuscularly, intravenously or intrathecally, or by combined routes, and in the 34 thus treated there were 10 deaths, but these cases were more severe. The recovery rate of the whole was 85·3 per cent., and in view of the fact that all these patients were gravely ill, the author attributes the high survival rate to the effect of the serum. In 70 cases recovery took place, after administration of serum, when the patients were apparently moribund. In 11 fatal cases the serum was given too late, in nine the amount given was probably too small (10 or even 5 cc.). *C. W.*

SERGENT (Etienne). Quelques observations épidémiologiques et cliniques sur les piqures de scorpions. [**Epidemiological and Clinical Observations on Scorpion Sting.**]—*Arch. Inst. Pasteur d'Algérie.* 1942. June. Vol. 20. No. 2. pp. 130–134. With 1 fig. & 1 graph.

Statistics of 1,869 cases are presented. The fatality rate was 9·4 per cent. in children, 1·5 per cent. in adults and 4·1 per cent. in aged persons. The seasonal incidence of stings commences in April, reaches a peak in August, and is practically over by October ; serious cases occur mostly in August. The hands and feet were principally affected, the arms and legs next, but stings are recorded on most parts of the body, including the tongue. Of the 183 scorpions identified, 142 were *Prionurus australis*, 26 *Buthus occitanus* and 10 *P. amoreuxi*. In serious cases the interval between the sting and the onset of alarming symptoms was four hours or less in most cases ; in fatal cases death may take place almost at once, or may be deferred up to 30 hours.

C. W.

SERGENT (Etienne). L'envenimement scorpionique provoque-t-il une élévation ou un abaissement de la température ? [**The Body Temperature after Scorpion Sting.**]—*Arch. Inst. Pasteur d'Algérie.* 1942. Sept. Vol. 20. No. 3. pp. 209–212. With 1 fig. [Refs. in footnotes.]

In 93 cases in which a note of temperature was made there was pyrexia in more than one-half, normal temperature in one-fifth, and subnormal temperature in one-quarter. It is, however, possible that in those cases in which pyrexia occurred, the cause was rather an activation of malaria than the simple action of the venom. Injection of venom into animals generally leads to lowering of temperature. In man, if subnormal temperature, or pyrexia, is prolonged after the sting, the prognosis is usually grave. *C. W.*

SERGENT (Etienne). Recherches sur la glycémie chez les cobayes envenimés par le venin de scorpion. [**Glycaemia in Guineapigs after Scorpion Poisoning.**]—*Arch. Inst. Pasteur d'Algérie.* 1940. June. Vol. 18. No. 2. pp. 239–247. With 3 graphs.

MOHAMMED (Ahmed Hassan). **Preparation of Scorpion Toxin.**—*Lancet.* 1943. Mar. 13. p. 337.

MUÑOZ RIVAS (Guillermo). Algunos datos sobre la araña " Coya " en el Tolima. [**Concerning the Spider " Coya " in the Department of Tolima.**—*Rev. Facul. de Med.* Bogotá. 1942. Oct. Vol. 11. No. 4. pp. 208–210.

Tolima is a Department of Colombia and lies to the west of Bogotá. In the district stories of the dangers of the bite of *Latrodectus curacaoensis*, locally the Coya spider, are general, and the author undertook some experimental work to test the truth of these reports. *L. curacaoensis* is a " small spider " [the dimensions are not stated] appearing of a uniform red colour at first sight, owing to two large red areas, one on the dorsal and one on the ventral surface, separated by a black ray along the edge of the body. The young show small dark spots on the dorsum symmetrically distributed. They are not greedy insects and will often seize and envelope their prey and leave it for several days before devouring it. They are commonest in the central and northern parts of Tolima, where the temperature ranges from 21° to 24°C. They lurk under stones.

Symptoms commonly reported as caused by their bite are : intense local pain, headaches, cramps which may persist for several days, tremor, and in some cases tetany.

The author prepared emulsions of the cephalothorax and injected them subcutaneously and intracutaneously into guineapigs without result. He then repeated the test using emulsions of the whole spider ; again without result. He then heard that toxic symptoms were produced only if the body of the spider were " energetically rubbed against the skin " [a most unlikely thing to happen under natural conditions]. He, therefore, rubbed specimens of the female spider thoroughly on the depilated skin of guineapigs. One showed transient distress and panting respiration, and the following day slight paralysis of the hind limbs. None of the others presented any symptoms, nor could the author observe any similar disturbance on subsequent experimentation.

He thinks that the symptoms reported by the people are, therefore, not caused by the toxin of the spider and that the bite produces no more than severe local pain and oedema and, in some cases, an erythematous spot with a sensation of burning. *H. Harold Scott.*

DERMATOLOGY AND FUNGOUS DISEASES.

Boletin de la Oficina Sanitaria Panamericana. 1942. Sept. Vol. 21. No. 9. pp. 910–922. With 5 charts & 6 plates. [Refs. in footnotes.]—**The Wild Fire (Pemphigus Foliaceus) of Brazil.**

The problem of this disease is of sufficient importance for the State of São Paulo to have established a special service and hospital for its study. There is no doubt that it is contagious and by June 1941, 500 cases had been registered during three years. Of these 15–20 per cent. had proved fatal. The clinical features of the disease are said to be exactly like those of pemphigus foliaceus seen in other parts of the world, but the subjective symptoms of itching, burning and acute pain are much more severe and have given rise to the popular name for the condition. The characteristic elementary lesion is a serous or purulent bulla. Nikolsky's sign [a condition in which the outer layer of the skin is easily rubbed off by slight injury] is always positive as the disease spreads over the body, a spread accompanied by evening rise of temperature. Once initiated, the affection settles into one of four types: acute, subacute (most common), superacute (with rapid fatal closure), or chronic. In this last form the picture may be dominantly bullous, foliaceous, pustular, hyperpigmented, papillomatous, erythrodermic or herpetiform. In this chronic form there also occur ankylosis of the joints, osteoporosis and disturbance of calcium metabolism. The nails become dystrophic, either white or as though stained with iodine (Vieira's sign), but they are rapidly replaced. Alopecia, palmar and plantar keratoses, lymphangitis of the ears with later local elephantiasis, and muscular atrophy are also sometimes seen. Severe endocrine disturbances develop, sometimes almost amounting to a change in sex. The ages between 15 and 19, and from 25 to 29 seem to be most susceptible. Of the total cases 66 per cent. are females. No race is immune, although the disease is most common in rural areas where sanitary conditions are poor. Lindenberg, after much experimental work, postulated the existence of a virus and he has transmitted the disease to rabbits by the injection into the testicle of serum from the blood of pemphigus cases. The virus was carried through several passages in animals and then finally transmitted to guineapigs. Confirmation of these findings is awaited. Cures (10 per cent.) are seen only when treatment is energetic and early. The best results follow careful hygiene, antiseptic baths, protection with boricated vaseline. One gramme of quinine is given by mouth daily, but arsenic and sulphonamides are not recommended. *Sydney Thomson.*

VIEIRA (João Paulo). "Fogo selvagem." Uma curiosa dermato
["**Wild Fire**" (**Pemphigus Foliaceus**).]—*Folha Med.* 1942. O
25. Vol. 23. No. 20. pp. 217–219.

"Fogo selvagem" ("Wild Fire") is the colloquial designation
Pemphigus foliaceus, a truly terrible condition when fully develope
It was spoken of as a very rare disease of the skin by CASENAVE
1850 and by various writers since then, particularly in Brazil, thou
it has been reported from Russia. It is more often seen in São Pau
where it has been observed for the past half century. The patie
feels as if he were on fire (hence the name) and almost the entire sk
may separate. In São Paulo there is a hospital where it is specia
studied. It is characterized by bullae, starting usually on the fro
of the chest, but it may extend to involve the whole body. Pain
severe and the suffering intense, both from heat and cold, because
the denudation; even the nails may be shed and joints become fixe
Sometimes the skin later becomes thickened in places, producing
pachydermatous, pseudo-elephantiasis condition. Happy is the man w
dies in the earlier stages of the disease, says the author. Its cause
quite unknown; it is not contagious [but see preceding abstract].
seems to occur mostly in rural districts where there are gullies a
streams and often many insects, one of which may be a vector. Diete
deficiencies have, of course, been incriminated, but there is no eviden
of any value to support the idea. Treatment of every kind has be
tried without any consequential benefit. Daily baths afford reli
Antisera, anti-toxins, endocrine preparations, arsenicals, sulpho
amides, vitamins, have all proved unavailing. [See this *Bulletin*, 192
Vol. 24, p. 451, and for the benefit following the use of chaulmoogra
pemphigus, this *Bulletin*, 1923, Vol. 20, p. 289.] *H. Harold Scott.*

SATULSKY (Emanuel M.). **Dermatitis Venenata caused by t
Manzanillo Tree.**—*Arch. Dermat. & Syph.* 1943. Jan. Vol. 4
No. 1. pp. 36–39.

"*Hippomane mancinella* L., family Euphorbiaceae, is a poisono
tree which is found on both sides of the isthmus and commonly alo
the sea shores throughout Panama and the Canal Zone. It oft
forms dense thickets along the beaches and is easy to recognize. T
common name is the manzanillo tree; the names beach apple and sho
apple are more recent ones." The fruit is bright red, 2·5 cm. in diamet
and shaped like an apple. Leaves, branches and fruits, when cut
bruised, exude a latex which is highly irritant to the skin, producin
a severe vesicular eczematization similar to that caused by *Rh
toxicodendron*. The material is also irritant to the mucous membrane
particularly the conjunctivae; when the leaf or fruit is eaten su
severe oedema of the oesophagus may be excited that tracheoto
becomes imperative. Dew falling from the leaves contains sufficie
toxin to cause marked reaction in many individuals. The best trea
ment is to immerse the affected part in sea water for half an hour,
bathing which not only relieves the symptoms but does also seem
be definitely curative. So true is this that the men working in t
Canal Department are all instructed to plunge into the sea if necessar
A case is described in full and reference is also made to related tre
which are recognized as being sources of severe eczematization, t
Hura crepitans (the sand-box tree) and two species of the genus Sapiu
Sydney Thomson.

González Ochoa (Antonio). El micetoma por *Actinomyces mexicanus* Boyd y Crutchfield, 1921, en Mexico. **Mycetoma due to *Actinomyces mexicanus* in Mexico.**—*Rev. Inst. Salubridad y Enfermedades Trop.* Mexico. 1942. Dec. Vol. 3. No. 4. pp. 303–317. With 11 figs. on 4 plates. English summary (3 lines).

In view of the importance of fungal diseases in North America the author proposes to undertake a study of them afresh. In this article he deals solely with *A. mexicanus*. He describes seven cases in detail, the history of progress being very similar in all—a papular nodule, painful at first, not later, multiplying and breaking down in two months or so, and extending but causing no fever and little or no constitutional disturbance, though the lesions may have persisted for years. The site involved varied—foot, leg, thigh, abdominal wall, thorax.

A description of the growth obtained on Sabouraud glucose (2 per cent.) and on Pai and Czapek's agar is given. The strain isolated differs in some essential particulars from that described as *A. mexicanus* by Boyd and Crutchfield in 1921, but as there were considerable variations in the characters of the growths obtained by the author in his cases he does not think the differences from the Boyd and Crutchfield growth warrant his regarding his own as of a different species. The characters of the main species of Actinomyces which cause mycetoma and of the strains isolated by the author are clearly set out in a Table. The illustrations are well reproduced, both of the clinical conditions and of the growth characters.

H. Harold Scott.

du Toit (C. J.) **Sporotrichosis on the Witwatersrand.**—*Proc. Transvaal Mine Med. Officers' Assoc.* 1942. June. Vol. 22. No. 241. pp. 111–127. With 37 figs. [26 refs.]

A detailed and clear history of our knowledge of sporotrichosis shows that it must now be regarded as frequently of industrial origin. Thus, in less than a year, 650 cases have occurred among men working in one shaft. At first natives only were affected, but more and more cases were seen among Europeans as the epidemic spread. Increased experience led to increased knowledge and detection became more accurate. In the same way more cases have been reported from America, mostly among farmers, florists and manual workers. The polymorphic features of the disease need to be better known, as there may, for instance, be spread from this particular mine. Many clinicians still tend to think only of the lymphangitic type, forgetting that ulcerative and other forms are seen. The lesions often resemble those produced by syphilis, tuberculosis and pyogenic infections such as osteomyelitis. Single or multiple unrelated nodules or ulcers may be situated on practically any part of the body and may be difficult to diagnose if the possibility of this disease is forgotten. It is curious that lesions have never been reported on the feet or in the region of the pelvic girdle. The lesion is obviously granulomatous but suspicion may only arise because of its chronicity, lack of response to ordinary treatment, and absence of any degree of pain or constitutional symptoms. Sinuses and verrucose formations are suspicious. There is often spread into the deeper tissues round the obvious lesion. The pure pus is a dull yellow colour but blood contamination often makes it salmon-pink. The primary lesion always follows an injury such as a

cut or an abrasion. This may not heal, but even if it does so it breaks down again. Then a week later the edges become thickened and the open wound covered with granulomatous fungating tissue, penetrated by sinuses. At first there may be close resemblance to a boil if infection has occurred through a hair follicle. Systemic infection has not yet been recognized. Diagnosis may be confirmed by the examination of direct smears, by culture or by inoculation of a white rat. The fungi isolated all conform, culturally, to *Sporotrichum beurmanni*. Agglutination and skin tests have been devised and seem to be reliable. Treatment is always effective; potassium iodide is given to a total of about 3,000 grains. It is usual to start with 15 grains three times a day and to work up to one drachm thrice daily. The pathological changes are described, and may be indicated briefly as those of a reticulo-endothelial response. The epidemiology and prevention of the disease in mines naturally receive very full consideration. The fungus, which appears to have been introduced into certain mines, grows well on timber and on mine mud; it can grow well wherever there is moisture and organic material. Various antiseptics have been tested, but most are ineffective in practicable dilutions. For rooms and clothing, formaldehyde gas is successful; the author advocates doubling the standard dose of 5 oz. formalin for 1,000 cubic feet for 10 hours, or increasing the period. Investigations are continuing. The photographic illustrations are excellent and helpful. *Sydney Thomson.*

WEISE (E. C.). **Prevalence of Sporotrichosis in Connecticut; Review of Three Cases and Report of New Case.**—*Connecticut State Med. Jl.* 1942. Nov. Vol. 6. p. 841. [Summary taken from *Jl. Amer. Med. Assoc.* 1943. Jan. 2. Vol. 121. No. 1. p. 75.]

Weise reports his third case of sporotrichosis, the fourth to occur in Connecticut. The disease may be mistaken for syphilis, as the ulceronodular and gummatous lesions may bear a close similarity to cutaneous gummas. Certain types of cutaneous tuberculosis and, at times, low grade streptococcic lymphangitis may be imitated. The general practitioner should consider it as a possible diagnosis in obscure ulcerative, ulceronodular and gummatous conditions, particularly when the lymph nodes appear to be involved. Cultures from areas which have broken through the skin either will not reveal the fungus or they will be grossly contaminated with staphylococci and other organisms. Pure cultures can almost invariably be obtained by utilizing previously unopened lesions. The three other culturally proved cases of sporotrichosis which have occurred in Connecticut are reviewed. The physician should familiarize himself with the various manifestations of the disease so that its true incidence may be ascertained and its otherwise prolonged period of disability avoided by appropriate management.

SKEER (Jacob). **Sporotrichosis. Report of a Case of Localized Lymphatic Type Originating in New York City.**—*Med. Times*, 1943. Jan. Vol. 71. No. 1. pp. 7–11. With 5 figs. [16 refs.]

The report of a case occurring in a white man, aged 63 years, and a native of New York City. There is a well-substantiated story of his having been bitten by an insect on the tip of the left fourth finger during December 1940. Thereafter this area became swollen and inflamed. Later several " boils " appeared on the back of the left hand, gradually

spreading up the forearm to the elbow. When he was seen in March 1941 there were several small pinkish nodules on the little finger, only one of which had broken down to exude some blood and pus. Numerous raised, firm, bluish and violet nodules, varying in size from that of a pea to that of a bean, were seen on the back of the hand, in the web adjacent to the fourth finger and as a linear formation on the back of the forearm. The site of the original bite showed as a nodule with crater-like necrotic centre and surrounding induration and pigmentation. *Sporotrichum schenki* was successfully cultivated on Sabouraud's peptone dextrose agar. All other investigations proved negative and the patient recovered on potassium iodide. *Sydney Thomson.*

PRUNES (Luis) & FREY (Juan R.). Cromoblastomicosis. [**Chromoblastomycosis.**]—*Rev. Argentina de Dermatosifilología.* 1942. Vol. 26. Pt. 4. pp. 1200–1205. With 5 figs.

The patient was an agricultural labourer, 25 years of age, who, when seen by the authors, stated that the lesion had started after a prick by a thorn five years before. By this time the foot and lower part of the left leg were swollen, verrucose and bathed in fetid, seropurulent discharge. The thigh was not affected but the groin glands were enlarged and hard, though painless. Culture on Sabouraud's medium gave rise to two growths; one was whitish and creamy, *Oidium albicans*, the other yeast-like of the Rhodotorula genus. Treatment by sodium iodide, by mouth, intravenously and by ionization, gave partial amelioration. Amputation was at one time debated, but scraping under local anaesthesia and " electro-coagulation " succeeded in so far that the patient was able to leave hospital after nine months. He did not return and the further progress cannot, therefore, be recorded. *H. Harold Scott.*

TROPICAL OPHTHALMOLOGY.

A REVIEW OF RECENT ARTICLES. XLI.*

The clinical picture of sore eyes with denudation of the skin at the canthi in association with angular stomatitis is very familiar in many parts of the tropics, and AYKROYD and VERMA[1] have studied the condition amongst patients attending the Madras Government Ophthalmic Hospital in order to ascertain the influence of riboflavin deficiency in causing the trouble. A low grade superficial keratitis with some circumcorneal injection was found in the majority of the cases. Dots and streaks of opacity could be detected in the superficial layers of the cornea; some of these stained faintly with fluorescine and superficial ulceration was occasionally observed. The patients were treated solely by intramuscular injections of " lactoflavin B.D.H." An initial injection of two milligrammes of the drug was given and this was followed by daily injections of from one to two milligrammes. Improvement occurred rapidly and all subjective symptoms disappeared in 3–12 days. Signs of riboflavin deficiency, however, tended

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* For the 40th of this Series see Vol. 39, pp. 886–890.

[1] AYKROYD (W. R.) & VERMA (O. P.). Superficial Keratitis due to Riboflavin Deficiency.—*Indian Med. Gaz.* 1942. Jan. Vol. 77. No. 1. pp. 1–5. With 1 fig. on plate. [16 refs.]

to recur within a short period on ceasing the administration of the vitamin. At this time it was not possible to treat more than thirteen patients owing to a shortage of the drug ; but VERMA[2] was later able to treat a further fifty cases with equal success.

ARNOLD and WHILDIN[3] have reported from North Carolina, U.S.A., a case of infection of the conjunctiva by *Rhinosporidium seeberi*. The patient was a white boy aged eight who had lived in North Carolina all his life ; the source of infection was not apparent. Two cases of the disease had, however, been previously reported recently from that part of the world. The polypus was attached to the outer portion of the lower fornix, and, its nature being suspected, was thoroughly eradicated. No recurrence has taken place after a lapse of two years. The polypus is described as a pink, fleshy growth covered by vascular glistening conjunctiva beneath which yellowish flecks stood out against the red background. [No mention is made of the strands of fibrous tissue, resembling the midrib and veinings of a leaf, which usually pervade these polypi.]

SANYAL and MAITRA[4] have claimed remarkable success in the treatment of some diseases of the eye common in Calcutta by the use of a 5 per cent. sulphanilamide ointment. A form of infectious keratoconjunctivitis with adenitis, which in many respects resembles trachoma but which does not lead to cicatrization, is frequently met with. The disease is aggravated by irritating and caustic treatment, but rapidly yields to the application of the ointment. The lachrymal sac may become infected and this may be relieved by placing a few drops of a 0·5 per cent. solution of sulphanilamide in the sac and subsequently using the ointment. Even post-operative sepsis was controlled by the use of this ointment and striking results were achieved in a case of post-trachomatous xerosis. Corneal leukomata, too, are stated to respond favourably to the treatment. The authors found that in the rabbit's eye, application of the ointment induced a general hyperplasia of the conjunctival and corneal epithelium and a swelling of the corneal corpuscles.

POLEFF[5] has found that a positive Weil-Felix reaction and a positive Weigl reaction may be obtained in a higher proportion of certain trachoma infections than in controls. He points out that normal serum in weak solution may prove positive and dilutions greater than 1–100 of the serum tested should therefore be avoided.

The experience of FREUDENTHAL[6] with sulphanilamide in the treatment of trachoma has been very favourable. He used a preparation called "albosal" (tablets each containing 0·4 gramme of sulphanilamide) and gave a daily dose of 4–6 tablets for five or six days and followed this by an intermission for two days. Suitable local

[2] VERMA (O. P.). Further Experience of the Treatment of Superficial Keratitis with Riboflavin.—*Indian Med. Gaz.* 1942. Aug. Vol. 77. No. 8. pp. 471–472.

[3] ARNOLD (Ralph) & WHILDIN (James). Rhinosporidiosis of the Conjunctiva.—*Amer. Jl. Ophthalm.* 1942. Oct. Vol. 25. No. 10. pp. 1227–1230. With 4 figs.

[4] SANYAL (Saradinu) & MAITRA (M. N.). Ocular Conditions Common in India and their Local Treatment with Sulfanilamide.—*Arch. Ophthalmology.* 1942. July. Vol. 28. No. 1. pp. 27–56. With 21 figs.

[5] POLEFF (L.). Zur Frage der Reaktion von Weil-Felix bei Trachom.—*Ophthalmologica.* 1942. Sept. Vol. 104. No. 3. pp. 121–135. [32 refs.]

[6] FREUDENTHAL (E.). Sulphanilamide in the Treatment of Trachoma.—*Lab. & Med. Progress.* Cairo. 1942. May. Vol. 3. No. 1. pp. 32–37.

treatment was employed at the same time. Conjunctival lesions due to the disease showed little or no response, but corneal complications were strikingly benefited.

HOGAN and CRAWFORD[7] have described an epidemic of *superficial punctate keratitis* which occurred in San Francisco during the last quarter of 1941. Employees in shipbuilding yards were chiefly affected and over two hundred patients were treated. The disease began with an acute conjunctivitis and an oedema of the caruncle and semilunar fold spread over the lower fornix and the bulbar conjunctiva. Conjunctival discharge was absent and relatively slight discomfort was experienced. Some glandular involvement was present in most of the cases. The corneal lesions corresponded to those described in other epidemics and were mostly situated in the superficial layers of the propria just beneath Bowman's membrane. Deep forms were also observed with wrinkling of Descemet's membrane and iritis. Staining with fluorescine did not occur. No special treatment was found particularly useful and the disease tended to undergo spontaneous cure. The authors suggest that the disease should be called epidemic keratoconjunctivitis.

WEINER, GAYNON and OSHERWITZ[8] have reported from Cincinnati an ulcer of the upper lid caused by *granuloma venereum* [not to be confused with lymphogranuloma inguinale]. The patient had suffered two years previously from a cicatrizing ulcer of the penis, and, when under treatment for resulting urethral stricture, developed an extensive ulcer of the upper lid which caused necrosis of a large portion of the tarsus. Large monocytes containing Donovan bodies were found on histological examination. Rapid healing took place on the administration of injections of 1 per cent. tartar emetic solution.

ESPILDORA and COUTTS[9] consider that *lymphogranuloma inguinale* may be accompanied by many different ocular complications and describe a form of chronic conjunctivitis due to the disease, which resembles Parinaud's syndrome. Chronic conjunctivitis also occurs and may lead to pterygium. Ophthalmoscopic examination of 30 patients suffering from the disease revealed in almost every case the presence of peripapillary oedema, hyperaemia and tortuosity of the retinal vessels.

ESTRADA[10] states that by using an electric ophthalmoscope with a plus 40 dioptre lens in the sight-hole, he has had no difficulty in detecting microfilariae in the vitreous of patients suffering from *onchocerciasis*. Eleven such patients were examined by him and microfilariae were found in all. He remarks that the parasites may be seen in the vitreous even when obvious signs of onchocerciasis are absent.

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[7] HOGAN (Michael J.) & CRAWFORD (Joseph W.). Epidemic Keratoconjunctivitis. (Superficial Punctate Keratitis, Keratitis Subepitheliasis, Keratitis Maculosa, Keratitis Nummularis.) With a Review of the Literature and a Report of 125 Cases.—*Amer. Jl. Ophthalm.* 1942. Sept. Vol. 25. No. 9. pp. 1059–1078. With 8 figs. [87 refs.]

[8] WEINER (Alfred L.), GAYNON (Irwin E.) & OSHERWITZ (Morris S.). Granuloma Inguinale of the Eyelid. Report of a Case.—*Amer. Jl. Ophthalm.* 1943. Jan. Vol. 26. No. 1. pp. 13–18. With 5 figs.

[9] ESPILDORA (Christobal) & COUTTS (Waldemar E.). Lymphogranuloma-Venereum Lesions of the Eyes.—*Amer. Jl. Ophthalm.* 1942. Aug. Vol. 25. No. 8. pp. 916–925. [49 refs.]

[10] ESTRADA (Antonio Torres). Ophthalmoscopic Observation of Microfilarias in the Vitreous of Patients Infected with Onchocerciasis.—*Amer. Jl. Ophthalm.* 1942. Dec. Vol. 25. No. 12. pp. 1445–1448.

The Annual Report of the Madras Government Ophthalmic Hospital for the year 1941[11] shows that 35,939 out-patients and 5,710 in-patients were admitted during the year. The hospital has 170 beds, but the daily average of in-patients was 322, many patients being accommodated on the ward verandahs. In the out-patient department 1,825 patients were admitted for trachoma, 954 for glaucoma, 6,130 for cataract, and 154 for keratomalacia. Superficial punctate keratitis is still fairly common, 85 cases of the disease being treated. It is interesting to note that 58 cases of sun injury to the macula lutea were seen during the year. Excision of the lachrymal sac for dacryocystitis was carried out 441 times. The combined extraction operation —capsulotomy and iridectomy—is still favoured for senile cataract, 2,061 of such operations were performed, but only 34 intracapsular operations. Sclero-corneal trephining maintains its supremacy in the operative treatment of glaucoma. *H. Kirkpatrick.*

Oberhoff (K.). Albucidbehandlung des Trachoms. [**The Treatment of Trachoma with Albucid.**]—*Deut. Militärarzt.* 1942. Sept. Vol. 7. No. 9. pp. 548–553. [24 refs.]

After reviewing German and foreign experiences on the treatment of trachoma with sulphanilamide, the author reports a series of 70 cases personally observed in which albucid by mouth was used. His conclusions are that, whilst albucid is of considerable value in the treatment of this affection, it is possible that such improvement as is noticeable is due to its effect on secondary infection rather than on the trachoma itself. It is of interest to note that, judging by the review of German experiences, the same cleavage of opinion on its value as was observed in other countries obtained in Germany ; reports ranged from lyrical enthusiasm to denials of any effect. *Arnold Sorsby.*

Pergola (Alfredo). Un triennio di attività del reparto oculistico. (Resoconto clinico-statistico degli anni 1937–1938–1939.) [**Three Years of Activity in an Eye Department in Eritrea.**]—*Boll. d. Soc. Italiana di Med. e Igiene Trop.* (Sez. Eritrea.) Asmara. 1942. Vol. 1. No. 1. pp. 26–59. With 5 figs. English summary.

MISCELLANEOUS.

Rames (C.). Beni Abbès (Sahara oranais). Etude historique, géographique et médicale. [**A Historical, Geographical and Medical Study of Beni Abbès.**]—*Arch. Inst. Pasteur d'Algérie.* 1941. Mar. Vol. 19. No. 1. pp. 80–157. With 1 map, 1 plan & 28 figs. on 10 plates. [Refs. in footnotes.]

Beni Abbès is in southern Algeria, 150 miles south of the Atlas mountains and on the border of the great Saharan plain. The scope of this paper is indicated by the title ; it is illustrated by a series of most attractive photographs. Malaria is endemic, as was pointed out recently by Fratani [this *Bulletin*, 1940, Vol. 37, p. 496] ; the anophelines found are *A. multicolor*, *A. hispaniola*, *A. sergenti* and

[11] Madras. Annual Report and Statistics of the Government Ophthalmic Hospital, Madras, for the Year 1941.—14 pp. 1942. Madras : Govt. Press. [8 annas.]

A. d'thali. Control by Gambusia is promising. A few cases of typhus and relapsing fever have been found, and one case of oriental sore. Beni Abbès appears to be the southern limit, in these regions, of distribution of oriental sore; the sandflies identified are *P. papataci*, *P. parroti*, *P. fallax* and *P. minutus*. Measles, whooping cough and cerebrospinal fever have been observed, but smallpox has practically disappeared as a result of vaccination, though it could break out in the unvaccinated women or nomads.

Cases of tuberculosis were not seen, but tuberculin tests indicated infection in 40·3 per cent. of adults.

Infant mortality is low, from 38 to 100 per 1,000 births [presumably live births], and breast-feeding is good. After the first year, however, gastro-intestinal infections, rickets and bronchopneumonia take a higher toll. Trachoma is widespread; syphilis is common, but gonorrhoea less so. Of the intestinal worms, Enterobius and Ascaris are exceedingly common; bilharzia has never been seen. Fleas are rare but lice are abundant. Scorpions and snakes are common.

Wounds heal quickly, and phagedaenic ulcer is not reported. The authors give an account of native medical practices. Dietetic resources are good, cereals, vegetables, grapes and dates are plentiful and use is made of animal food and freshwater fish. There is no mention of deficiency disease other than rickets. *C. W.*

Degotte (J.) & Zanetti (V.). Diagnostique démographique d'une peuplade Mabudu au Nepoko (Kibali-Ituri). [**Demographic Studies in Nepoko.**]—*Rec. Travaux Sci. Méd. Congo Belge.* Léopoldville. 1942. Jan. No. 1. pp. 125–134.

During the course of a recent medical census undertaken in three districts of the Mabudu tribe situated in the basin of the Nepoko, Belgian Congo, the authors assembled a mass of demographic data which they later analysed; they now present the results of their work. Some 37,000 persons were dealt with, but in addition to the actual data assembled in the course of this specific operation the authors used for purposes of comparison and verification of their own analyses and results the data made available from the investigations of earlier workers. The results of the enquiry are set out in a series of carefully prepared tabular statements; in the Table presenting the total population figures in five-yearly age groups, the methods applied for the estimation of these groups are not precisely described, but evidently great care has been exercised in this as in other branches of the work for it is explained that every endeavour was made "to establish ages with the greatest possible exactitude." Interference with normal population development among the peoples under review during the period 1915–1930 is ascribed to such influences as the absence of adult males to engage in gainful employment at places remote from their homes, to the wide distribution of venereal diseases, and to other external though non-racial causes. Favourable reactions to former adverse influences are now noticeable and it is believed that, provided no new external influences of harmful character arise to disturb present progressive improvement, the tribe will become a biologically sound population. *P. Granville Edge.*

Bercovitz (Z.). **A Summary of Preventive Methods in Certain Tropical Diseases.**—*Amer. Jl. Digestive Dis.* 1942. Oct. Vol. 9. No. 10. pp. 327–329.

SMITH (E. C.). **Child Mortality in Lagos, Nigeria.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1943. Mar. Vol. 36. No. 5. pp. 287–303. With 1 graph & 18 figs. on 8 plates. [18 refs.]

The author made post-mortem examinations on 500 children of ages up to three years whose deaths had not been medically certified. The examination was as complete as possible and included microscopical examination of paraffin and frozen sections and of smears taken from the brain and spleen, observation of helminthic infestation, and bacteriological investigations.

The 500 children comprised 259 males and 241 females and formed about 17 per cent. of the total number of deaths in that age group. There were 181 aged 0 to 6 months, 112 from 7 to 12 months old, 137 from 13 months to 2 years, and 70 from 25 months to 3 years. When information as to age was inaccurate an estimate was made from the dentition and the body growth.

Causes of death.—The author summarizes the chief causes of death as follows :—

	No. of cases	Percentage
Respiratory diseases	343	68·6
Malaria	72	14·4
Diseases of the alimentary tract	20	4·0
Meningitis	18	3·6
Anaemia	14	2·8
Malnutrition (faulty diet) and/or starvation ...	14	2·8
Congenital group	8	1·6
Miscellaneous	11	2·2
Total	500	

Respiratory diseases.—The 343 cases were composed of the following :—

Bronchopneumonia... ...	276	Pleurisy ...	3
Lobar pneumonia	26	Diphtheria ...	1
Pulmonary tuberculosis ...	32	Empyema ...	1
Abscess of lung	3	Gangrene ...	1

Bronchopneumonia.—While being the primary cause of death in 276 children, this was present in all the 500. In 15 of the 276 cases there were also present certain visceral lesions suggestive of typhoid fever which the author terms abdominal syndrome, a condition frequent in young adults and characterized by swelling and congestion of the spleen, mesenteric lymph nodes and the lymphoid tissue of the caecum, ascending colon and proximal few feet of the ileum.

The fatal bronchopneumonia cases could be classified into haemorrhagic, bronchiolitic and interstitial groups. Pneumococci were isolated 135 times (34·4 per cent) from 382 cases by inoculation of mice and the results are shown in a table. Type 6 was found in 61 cases (45 per cent.) while Types 1, 2 and 3 were rare. Other organisms were isolated from 42 of the children, including streptococci in 25. *Staphylococcus aureus* was found in three cases of lobar pneumonia and was associated with pleurisy, abscess and empyema.

Pulmonary tuberculosis was of an acute type ; in 25 of the 32 cases there were also tuberculous lesions in the spleen, kidney, liver and abdominal lymph nodes, and in six there was tuberculous meningitis. Many of these lesions showed no well-defined tubercles or giant cells, but acid-fast bacilli were present.

Diphtheria was the cause of death in one child only. The organism was isolated and was investigated by Dr. ELMES who found it virulent for a guineapig. Diphtheria is a rare disease in Lagos.

Malaria was the primary cause of death in 72 of the children. In addition to these, 162 showed much pigment in the liver, and the author considers that malaria was probably a contributory factor in these cases. As regards ages at death, 18, all cerebral in type, occurred at 0 to 6 months, 24 at 7 to 12 months, 19 at 13 months to 2 years, and 11 at 25 months to 3 years. The heart muscle showed well-marked degeneration in 18. Haemoglobinuria with degenerative changes in the kidneys was observed in 2.

Diseases of the alimentary tract.—These included colitis (9), amoebic dysentery (3), and hookworm infection (1). Helminths were found in 183 (36·6 per cent.) of the children, Ascaris being the most frequent. Hookworm and *Trichuris trichiura* were few in number though often present.

Meningitis.—Pneumococci were isolated from 15 of the 18 children who died of meningitis (excluding tuberculous meningitis). In three instances the type was different from that in the lungs, indicating that the meningitis was not secondary to the lung infection.

Anaemia.—This included six deaths from acute sickle cell anaemia and four from splenic anaemia.

Malnutrition.—Avitaminosis was indicated by the naked eye and histological findings in four of the 14 children of this group. The liver cells showed very marked fatty changes and the convoluted tubules of the kidneys also showed fatty degeneration. Such lesions have been attributed by CLARK to the action of certain native foodstuffs, especially cassava and coco yam. The author therefore determined the incidence of these changes and of albuminuria in the 500 children. Albuminuria was present in 180 (86 per cent.) of 208 examined, and frozen sections of 350 specimens of kidney showed well defined fat changes in the cells of the convoluted tubules in 112 (32 per cent.). There were varied degrees of fatty change in the liver cells in 290 (58 per cent.) of the 500 children and in 49 the condition was extreme.

Although these findings support Clark's thesis the author thinks it unwise to advance any conclusions in the absence of comparative figures from other parts of West Africa.

Congenital group.—This included three cases of icterus neonatorum, one of cystic kidney, one of hydrocephalus, one of patent foramen ovale, one of bilateral suprarenal haematoma and one of syphilis.

Miscellaneous.—Biliary cirrhosis caused two deaths and myocarditis caused one, a male child aged one year.

The paper is illustrated by 18 photographs ; they include eight photomicrographs of pneumonia, two of tuberculous lesions (kidney and spleen), one of focal necrosis of the liver in lobar pneumonia and two which show foetal stages of glomerular development in the kidney of an infant aged one month. The others are photographs of suprarenal haematoma, of cross sections of spleen and lymph node, and of the caecum and ileum. *J. F. Corson.*

GRANT (Alan) & BARWELL (Claud). **Chronic Melioidosis. A Case Diagnosed in England.**—*Lancet.* 1943. Feb. 13. pp. 199–201.

Melioidosis a glanders-like condition occurring in the Far East was discovered in Rangoon by WHITMORE in 1912 at post mortem examinations and subsequently demonstrated in life by STANTON in Malaya. Primarily a disease of rodents due to *Pfeifferella whitmori* it is transmitted occasionally to man in some way as yet unascertained producing a highly fatal disease characterized by the formation of multiple infective granulomata. The majority of patients die in the acute stage ; rarely it may pass into a subacute or chronic form. Of the 83 cases recorded by STANTON and FLETCHER in 1932, all but 2 were fatal within 21 days of onset.

The case recorded by the authors of this paper is of considerable interest, not only as a careful study of that rare condition, chronic melioidosis , but also because it is the first case of melioidosis diagnosed in this country. The patient, a regular soldier, served in Singapore from 1935 to 1938 ; he did three months' duty in Penang in 1938 during which time he was in rat-infested quarters. He contracted gonorrhoea in January 1938. In May 1938 two months after returning from Penang he developed arthritis of the right hip and in June, arthritis of the right ankle. After transfer to Gibraltar in December 1938, the gonorrhoea recurred but responded to sulphanilamide and prostatic massage. He returned to England in February 1941, and remained free of symptoms until June 1941, when he developed bilateral bronchopneumonia, accompanied by a recurrence of pain and stiffness in the right hip. The pneumonia responded to sulphapyridine. The blood showed a moderate degree of anaemia with a normal leucocyte count ; urine and stools were normal. Blood culture (repeated), gonococcal fixation test, Wassermann reaction and Mantoux were negative and the Widal consistent with T.A.B. inoculation ; the blood sedimentation rate was 56 mm. The temperature fell to normal in 10 days and the pain in the hip subsided. Fever recurred from time to time, but by October full and painless movement of the joint was obtained. All laboratory investigations remained negative except the Wassermann and Kahn reactions, which had now become positive ; the patient was given a course of N.A.B., bismuth and potassium iodide. The Wassermann and Kahn reactions were still positive in November 1941, but became negative in May 1942. In January 1942, pain in the hip joint recurred and he developed pneumonitis in both lower zones and a right peroneal palsy with foot-drop. Brawny swellings appeared over the left forehead, the left parotid and both external malleoli. X-ray of the skull showed local osteomyelitis. Abscesses slowly formed which healed well after incision and curettage. In April 1942, pain in the back developed and in July a large perispinal abscess was revealed by X-ray, with partial destruction of the 4th and 8th dorsal vertebrae. In February 1942 the patient developed a urethro-rectal fistula. Repeated blood transfusions were given ; they relieved the anaemia and sustained the patient. Sulphapyridine, sulphathiazole and sulphadiazine all controlled the temperature, the last being the most effective ; none had any effect on the formation of abscesses.

Pfeifferella whitmori was isolated from pus obtained from the lesions of the parotid gland, forehead and ankle. It agreed in cultural characters, with some minor differences, with the description given

by Stanton and Fletcher for rough strains of *Pf. whitmori*. It was pathogenic for the mouse and guineapig, particularly the latter, and gave the Strauss reaction in male guineapigs. The mice showed a glairy peritoneal exudate with numerous small necrotic foci in the spleen and liver ; *Pf. whitmori* was grown from the heart blood. Male guineapigs showed somewhat similar findings with, in addition, obvious testicular swelling and patchy periorchitic deposits of pus ; the heart blood grew *Pf. whitmori*. Histologically the lesions consisted of foci of acute pyogenic inflammation in which karyorrhexis was a feature. The patient's serum agglutinated his own organism to a titre of 1 in 250 but failed to react with a strain of *Pf. whitmori* obtained from the National Collection of Type Cultures ; this culture was avirulent for the mouse and gave a smooth type of growth.

The authors discuss the question of the date of onset of melioidosis in their patient. Infection must have been acquired early in 1938. If the arthritis developing in May 1938 constituted the first signs of infection, the onset was insidious, which is unlike previously described cases of melioidosis. The arthritis may have been gonococcal, in which case the initial sign of melioidosis would be the bronchopneumonia of June 1941, making an incubation period of three years.

S. P. Bedson.

Richards (Henry). **Desert Sores.** [Correspondence.]—*Brit. Med. Jl.* 1943. Mar. 13. pp. 334–335.

The author has not been able to satisfy himself that dietetic insufficiency plays any important part in the causation of desert sore. As a result of his experience with the troops in East Africa he considers the principal factors to be :—(1) Liability to trauma under Service conditions ; (2) Lack of facilities for good personal hygiene ; (3) Flies. In treatment he advocates gentle cleansing and the application of elastoplast so as thoroughly to occlude the ulcer ; this dressing should be changed at intervals of 5 days, and the majority of sores are well healed after three applications. Sulphanilamide powder may be used, covered with vaseline gauze and elastoplast, with good results, but lotion dressings are to be deprecated unless they can be changed frequently enough to prevent drying and sticking. *C. W.*

Cleland (J. Burton). **Injuries and Diseases in Australia Attributable to Animals (Insects Excepted).—Series V : Mammals, Fish, Spiders, Mites and Ticks et cetera, Shell Fish, Sponges, Protozoa.**—*Med. Jl. Australia.* 1942. Oct. 3. 29th Year. Vol. 2. No. 14. pp. 313–320. [49 refs.]

Derbeneva-Ukhova (V. P.). Influence de la température sur les larves de *Musca domestica* L. [**Influence of Temperature on Larvae of *M. domestica*.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 521–524. With 2 graphs. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. p. 27.]

In the experiments described, which were carried out to ascertain the effect of medium and high temperatures on the development of larvae of *Musca domestica*, L., newly hatched maggots were placed in

tumblers on fresh dung, which was renewed daily, and kept at a relative humidity of 70–80 per cent. and constant temperatures of 25–43° C. [77–109·4°F.]. The larval stage was shortest (averaging 3·1 days, with a minimum of 2·5) in pig dung at 34°C. [93·2°F.]. In horse dung it averaged least (4 days) at 36°C. [87·8°F]. It lasted about 7·5 days in pig dung and 6·5 days in horse dung at 25°C., and about 5 days in both at 43°C., which is evidently not the upper thermal limit. Larvae about to pupate endeavoured to leave the dung at 36°C. and above, and the number of individuals that did so increased as the temperature rose. Those that remained pupated, but the percentage mortality among pupae that developed at 36–43°C. varied directly with the temperature. All the larvae pupated and gave rise to normal adults when transferred at the beginning of the prepupal stage from high temperatures to 25°C. Development in pig dung was quicker at all temperatures, except the extremes, than in horse or cow dung, and larvae reared on it were larger. This is thought to be due to the favourable humidity of pig dung, which is intermediate in this respect between the other two.

The effect of temperature on the activity of larvae in the second and third instars and those about to pupate was determined by placing larvae reared at 25°C. on damp filter paper on a cooled or warmed surface and measuring the distance they covered. The range of temperature at which they were active and the optimum for activity were 10–42°C. [50–107·6°F.] and 35°C. [95°F.] for second-instar larvae, 8–45°C. [46·4–113°F.] and 36°C. for the third instar, and 5–43°C. [41–109·4°F.] and 29°C. [84·2°F.] for those about to pupate. The activity of second-instar larvae decreased considerably at temperatures above the optimum, and much more so than that of the third instar; there was no apparent decrease in the activity of the larvae ready to pupate.

DERBENEVA-UKHOVA (V. P.). Adaptation des larves de *Musca domestica* L. à des hautes températures. [**Adaptation of Larvae of *M. domestica* to High Temperatures.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 525–527. With 1 graph. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. pp. 27–28.]

Larvae of *Musca domestica*, L., were observed developing in large heaps of horse dung at over 40°C. [104°F.] and occasionally even at 48–49°C. [118·4–120·2°F.], a temperature that appeared to be too high for larval activity in the laboratory [see preceding abstract]. Since the laboratory results may have been affected by the sudden transference of the larvae from moderate to high temperatures, experiments were carried out to ascertain whether they can adapt themselves to gradually increasing temperatures. In the field, the temperature of the horse dung on which the eggs are laid and the larvae begin to develop seldom exceeds 35°C. [95°F.], but if the dung is piled into large heaps, it ferments and becomes heated, so that the temperature just below the surface may be above 40–45°C. by the time the larvae reach the third instar. In the experiments, therefore, eggs were placed at 32–33°C. [89·6–91·4°F.] and the temperature was subsequently increased gradually so that the larvae of the third instar developed at a maximum of 44–48°C. [111·2–118·4°F.].

The adaptation of the larvae was demonstrated by the effect of temperature on their activity and by the rate of mortality. The

temperature range of activity and the optimum for it were 12–48°C. [53·6–118·4°F.] and 41°C. [104·9°F.] for third-instar larvae from the series in which the temperature was raised to 44°C., whereas they were 8–45°C. [46·4–113°F.] and 36°C. [95·9°F.] for similar larvae bred at 25°C. [77°F.]. Thus, larvae reared at the increasing temperature were more tolerant of high temperatures than those kept at 25°C.; they were also more sensitive to a decrease in temperature, which lowered their activity more than it did that of the larvae reared at 25°C. The effect of high temperature on mortality was determined by placing larvae on pans heated to temperatures ranging from 39 to 51°C. [87·8–123·8°F.]. The fatal temperatures varied directly with those at which the larvae had been kept immediately preceding the test, but all the larvae died at 51°C.

The survival of the larvae in the field when the temperature of the dung is high may, therefore, be explained by their adaptation.

Egorov (P. I.). Essai d'utilisation de la fumigation du sol comme moyen de la destruction des agglomérations de nymphes de mouches. [**Soil Fumigation for Destruction of Fly Pupae.**]—*Med. Parasit. & Parasitic Dis.* Moscow. 1940. Vol. 9. No. 5. pp. 528–530. [In Russian.] [Summary taken from *Rev. Applied Entom.* Ser. B. 1943. Feb. Vol. 31. Pt. 2. p. 28.]

An account is given of experiments carried out near Odessa in view of the desirability of finding a soil fumigant that would be effective against pupae of *Ceratitis capitata*, Wied. Since a sufficient number of pupae of this Trypetid were not available, pupae of the house-fly [*Musca domestica*, L.] were collected from refuse dumps and placed in muslin bags at a depth of about two inches in the soil of field plots. The fumigants tested were paradichlorobenzene, polychlorides [a mixture of chlorobenzenes] and a preparation called calcium cyanide that contained about 40 per cent. sodium cyanide, and the soil was covered with paper as soon as they had been applied. The edges of the paper were pressed down with earth, and it was left in place for the period of exposure.

The best results (complete or almost complete mortality in three days) were obtained from the use of paradichlorobenzene applied at the rate of 1·2 oz. or more per sq. yd. by strewing it over the surface of the soil or by dissolving it in kerosene and watering the soil with the solution. Since a few pupae gave rise to adults, however, it is considered that the period of exposure should have been longer. The effectiveness of paradichlorobenzene decreased when the pupae were placed at greater depths; it killed many of them at a depth of 8 ins., but not at 16 ins. Polychlorides, applied in holes or poured over the surface of the soil, were effective, but not reliable even at high dosages; it is considered that they would be of value against fly pupae if used at the rate of about 3 oz. per sq. yd., but further tests are required. The cyanide killed up to 99 per cent. of the pupae when used as a 2 per cent. solution in water and applied at the rate of 1·8 or 2·4 oz. per sq. yd., but was unsatisfactory when the dry flakes were introduced into the soil, even if the latter was damp after rain. A bitumen emulsion diluted with water was sprayed over the treated soil as a substitute for paper, but did not give promising results.

It is concluded from these experiments that the fumigants tested could be successfully used for the control of *M. domestica* in refuse

dumps and other places where the larvae and pupae occur, provided that they could be satisfactorily covered after the treatment.

CORLETTE (C. E.). **On the Calculation of the Heat and Moisture Dissipated from the Body by Respiration, with a Table Designed to make Calculation Easy at any Temperature, and Humidity, and any Pressure of the Air.**—*Med. Jl. Australia.* 1942. Sept. 5. 29th Year. Vol. 2. No. 10. pp. 198–203. [Summary appears also in *Bulletin of Hygiene.*]

The mode by which heat is exchanged between the body and the air during respiration has been studied with a view to the measurement of the quantity of heat transferred. A Table is presented which facilitates the calculation of the amount of heat, or of moisture, lost from the body by respiration in various circumstances.

Certain fundamental measurements are required. It is necessary to know the volume of the respiratory ventilation per unit of time, together with the temperature, degree of humidity, and the barometric pressure of the air at the time of the experiment. In breathing air, one inspires usually an atmosphere only partially saturated with water vapour. The temperature of respired air is assumed to be 33°C. and the inspired air, if cooler than this, has to be warmed from its initial temperature to 33°C. It has also to be saturated with water vapour at 33°C., and this moisture will be absorbed from the respiratory passages. On the other hand, if the temperature of the inspired air is above 33°C., this air will have to be cooled to 33°C., and the weight of water vapour carried has to be adjusted to the amount that can be carried by saturated air at 33°C.

The use of the Table is fully explained by means of an example which is worked out in detail. The large respiration calorimeters available make it possible to measure the total calories lost from the body, and at the same time they tell what proportion of the loss is due to evaporation. It is more difficult to estimate separately the amount of heat lost by various channels. But if the total heat lost from the body by evaporation is already known, and if, by the methods now described, one can calculate separately the heat lost by vaporization in the breath, the problem becomes simpler, because the other part of the water vaporized must have come through the skin surface, either as insensible perspiration or as sweat. The rest of the heat lost, that due to the voiding of urine and faeces is easily measured; and the amount of heat lost by warming the inspired air is known. The remainder of the heat lost escapes by radiation and conduction from the body surface.

The mean summer and winter records at various places with widely differing climatic conditions are also considered, with regard to their effect on respiratory heat loss. Without exception, both in winter and summer, the leat lost by adding water vapour to the inspired air is from two to three times as great as that required to warm the air to body temperature. This applies even to the coldest winter climate considered, *viz.*, in Chicago. *C. G. Warner.*

GLOVER (J.). **The Efficiency of Headgear as Insulation against Radiation.**—*Trans. Roy. Soc. Trop. Med. & Hyg.* 1942. Nov. 30. Vol. 36. No. 3. pp. 195–196. With 1 chart.

In an earlier paper CORSON [*Jl. Trop. Med. & Hyg.*, 1926, Vol. 29, p. 2.] described experiments in which he compared the efficiencies of

various kinds of headgear as insulators against solar radiation. A Panama was found to be more efficient than various felt hats, while a lady's pith helmet and a man's polo hat, both white, were more efficient than the Panama.

In this paper, Glover reaches somewhat similar conclusions by a different method. His experiments were done indoors, in calm air, and were designed to measure the rise in temperature inside headgear exposed to a standard source of radiation (a 50-watt lamp in a reflector) which was suspended at a standard distance (28 cm.) vertically above the crown of the hat under test. The radiation falling on the crown of the hat was equivalent to 0·4525 gm.-calorie per square cm. per min., or about one-quarter of the vertical component of solar radiation at midday in Amani, Tanganyika Territory, where the experiments were done. The hat was supported on an artificial head of stuffed cloth, and a thermojunction was placed on the " head " at a point corresponding to the upper parietal region. The insulating efficiency of a hat was gauged by the rise in the temperature of the thermojunction on the " head " when the hat under test was subjected to radiant heat; the more efficient the insulation the less the temperature rise.

It would need prolonged experiments to ensure that the temperature within the hat reached equilibrium. The data given in the paper show the rise in temperature for different types of hats during exposure of 45 minutes. At the end of that period equilibrium had not nearly been reached. Nevertheless, the temperature curves that are given show clearly the relative insulating values of the various hats.

The best insulator amongst the hats tested, was a brown pith hat with a lining of aluminium paint, and weighing 280 grammes. Not quite so good was another brown pith hat, this time only 180 grammes in weight, with a red cloth lining. The remaining four types of hat were distinctly less effective than the pith hats. For short exposures of not more than about 10 minutes, cork hats (brown or white) were the best among these, but after 30 to 45 minutes they were scarcely any better than the poorest hat, a brown single felt of 140 grammes weight. A double felt, also brown, weighing 210 grammes was rather better than the single felt, and for long exposures slightly better than cork. The best of these four, for exposures longer than about half an hour, was a white panama of 110 grammes weight. *T. Bedford.*

BOOK REVIEW.

Whitby (Lionel E. H.) [C.V.O., M.C., M.A., M.D. (Cantab.), F.R.C.P. (Lond.), D.P.H., etc.] & Britton (C. J. C.) [M.D. (New Zealand), D.P.H., etc.]. **Disorders of the Blood. Diagnosis, Pathology, Treatment and Technique.** 4th Edition.—pp. xii+595. With 12 plates (8 coloured) & 59 figs. Churchill's Empire Series. 1942. London: J. & A. Churchill, Ltd., 104 Gloucester Place, Portman Square. [28*s.*]

It is a pleasure to record the publication of the fourth edition of this excellent text-book. The subject matter has been increased without any appreciable increase in the size, and this has been brought about by some condensation without loss of clarity. Several chapters have been

partly rewritten, and care has been taken to bring each one up to date by inclusion of the latest work. The subject index has also been expanded.

There is hardly one of the 24 chapters which fails to show some progress in knowledge since the last edition came out. The one on purpuric and haemorrhagic disease has been largely rewritten, and the classification altered by the recognition of the prothrombin-deficient group. The intradermal moccasin snake-venom test is described and its value noted in distinguishing simple menorrhagia from uterine haemorrhage due to essential thrombocytopenia: vitamin P is mentioned with its apparent power to control some forms of capillary haemorrhage; and the interesting work of MACFARLANE with the capillary microscope is included. The latter suggests that one important factor in thrombocytopenic purpura is the defective contractility of the capillaries.

Tropical nutritional anaemia is now known to respond well to crude liver as against refined liver preparation (WILLS, EVANS and NAPIER) though FAIRLEY has succeeded with very large doses of anahaemin. Kala azar has a diagnostic aldehyde reaction, and is now successfully treated by neostibosan and other drugs. New work on the metazoa by Fairley and others is included. BOMFORD and RHOADS's work on refractory anaemias receives frequent mention in the text.

The new LANDSTEINER blood sub-groups and intra-group agglutinins are fully described and many valuable practical conclusions on blood transfusion reactions, choice of fluid, etc., have been added to this chapter. The one on blood pigments has been revised and it is evident that the story of the porphyrins is not yet complete. The inclusion of Creed's technique for red cell fragility is welcomed, though many pathologists have been using it, or its earlier form, for twenty years.

The indexing is good, though in view of the full authors' index at the end it might be more convenient for readers if the references, now given at the end of each chapter, were placed as footnotes on the appropriate page under the text. Features which in earlier editions have proved deservedly popular with students and practitioners alike are the arrangement of subjects with paragraph headings in bold type, the numerous illustrations, often in colour, the ample bibliographies, and the short summaries at the end of each chapter. The authors are to be specially congratulated on their effort in the midst of war-time difficulties to keep their text-book abreast of the times.

C. H. Whittle.

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ALPHABETICAL LIST OF AUTHORS OR SOURCES

Alcay, L., Marill, F. G. & Musso, J. C., 467.
d'Allaines, F., Lavier, G. & Gandrille, 472.
Arnold, R. & Whildin, J., 492.
Aykroyd, W. R. & Verma, O. P., 491.

Banerjee, D. N., 454.
Barnéoud, J. & Gaud, J., 469.
Baron, B. & Brunner, M., 477.
Beltran, E., 455, 460.
—— & Bustamante, M. E., 441.
—— & Lopez Portillo, S., 459.
Blakhov, A. A. & Kuptzova, A. D., 435.
Bobrov, M. V., 441.
Boletin de la Oficina Sanitaria Panamericana, 487.
Bustamante, M. E., Kumm, H. W. & Herrera, J. R., 453.

Cameron, J. D. S. & Lawler, N. A., 458.
Chapman, C. J., 454.
Chiari, H., 444.
Clastrier, J., 460, 471.
Collignon, E., 480.
Corlette, C. E., 503.
Culbertson, J. T. & Rose, H. M., 471.

Degotte, J. & Zanetti, V., 495.
DeKleine, W., 481.
Derbeneva-Ukhova, V. P., 499, 500.
Deschiens, R., 455.
Devine, J. & Fulton, J. D., 440.
Diaz, M. P., 459.
Djaparidze, P. S., 481.
Du Toit, C. J., 469.

Egorov, P. I., 501.
Espildora, C. & Coutts, W. E., 493.
Estrada, A. T., 493.

Fereaud, C., 481.
Ferri, L. V., 459.
Fox, J. P. & Cabral, A. S., 451.
Freudenthal, E., 492.
Frões, J. A. G., 442.

Gingrich, W. D. & Fillmore, R. S., 439.
Glover, J., 502.
Gontaeva, A. A., 436.
Gonzalez Ochoa, A., 489.
Goritzkaya, V. V., 433.
Grant, A. & Barwell, C., 498.

Hamilton, J. B., 461.
Hermann, H. B. & Berman, L. S., 457.
Hewitt, R. I., Richardson, A. P. & Seager, L. D., 439.
Hogan, M. J. & Crawford, J. W., 493.

Jiménez-Martínez, P., 447.

Kaufman, W. H. & Smith, D. C., 483.
Krasikova, V. I., 434.

Lara, M. B., 464.
Laurentius, P., 445.
Lincicome, D. R., 456.

McCoy, G. W., 465.
Madras, 494.
Maegraith, B., Findlay, G. M. & Martin, N. H., 440.
Manalang, J., 465.
Marill, F. G., Alcay, L. & Musso, J. C., 466.
Mazzotti, L., 476.
Meeser, C. C. V., 475.
Mihaljević & Radičev, 446.
Millan Gutierrez, J., Salazar Mallen, M. & Martinez Baez, M., 482.
Moore, D. F., 480.
Muir, E., 462, 463 *quin.*
Muñoz Rivas, G., 486.

Nehaul, B. B. G., 442.

Oberhoff, K., 494.
Ortega, F., 431.

Pampana, E., 427, 429.
Parker, R. R., 448.
Pirosky, I., Pirosky, R. de & Casiraghi, J. C., 474.
Plotz, H., 443.
Podyapolskaya, V. P., 474.
—— & Kamalova, A. G., 474.
Poleff, L., 492.
Popov, V. M., 434.
Prunes, L. & Frey, J. R., 491.

Rumes, C., 494.
Rees, C. W., Bozicevich, J., Reardon, L. V. & Jones, F., 456.
Rémond, M., 443.
Rey, F., 442.
Richards, H., 499.
van Riel, J., 462.
Rigdon, R. H., 436.
Rodaniche, E. C. & Kirsner, J. B., 455.
Rodhain, J., 438.
Russell, P. F. & Rao, T. R., 435.

Sanyal, S. & Maitra, M. N., 492.
Satulsky, E. M., 488.
Sautet, J., 461.
Sergent, E., 485 *quat.*, 486.
Shapkin, L. A., 437.
Sierra Leone, Medical Department, 432.
Skeer, J., 490.
Smith, E. C., 496.
Spaeth, H., 478.
Sylla, A., 445.

Thomson, R. C. M., 436.
Trowell, H. C., 484.

Vaux, D. M., 483.
van den Ende, M., Stuart-Harris, C. H., Harries, E. H. R. & Steigman, A. J., 449.
Vedder, E. B., 432.
Verma, O. P., 492.
Vieira, J. P., 488.

Weiner, A. L., Gaynon, I. E. & Osherwitz, M. S., 493.
Weise, E. C., 490.
Whitby, L. E. H. & Britton, C. J. C., 503.
Wilcox, A., 432.
Windorfer, A., 446.

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